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ENVIRONMENTAL ASSESSMENT FOR LOCK AND DAM 21 MAJOR
REHABILITATION MARION COUNTY MISSOURI AND ADAMS COUNTY
ILLINOIS (U) ARMY ENGINEER DISTRICT ROCK ISLAND IL

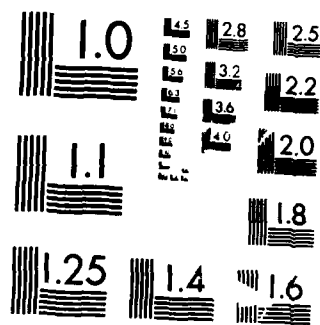
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REPLY TO
ATTENTION OF
NCRPD-E

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

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ENVIRONMENTAL ASSESSMENT
FOR
LOCK AND DAM 21 MAJOR REHABILITATION
MARION COUNTY, MISSOURI, AND ADAMS COUNTY, ILLINOIS

FEBRUARY 1987

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MARION COUNTY, MISSOURI, AND ADAMS COUNTY, ILLINOIS

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ATTACHMENTS:

Finding of No Significant Impact (FONSI)

Pertinent Correspondence

Clean Water Act, Section 404(b)(1) Evaluation

Distribution List

ENVIRONMENTAL ASSESSMENT
FOR
LOCK AND DAM 21 MAJOR REHABILITATION,
MARION COUNTY, MISSOURI, AND ADAMS COUNTY, ILLINOIS

BACKGROUND. Lock and Dam 21 is a component of the inland waterway navigation system of the Upper Mississippi River Basin. Construction, operation, and maintenance of Lock and Dam 21 was authorized by the River and Harbor Act of 1930. Construction commenced in 1933 and was completed in 1935.

An Environmental Impact Statement was prepared for Operation and Maintenance of the Upper Mississippi River Nine-Foot Channel Project Pools 11 Through 22, with the Statement of Finding filed with the Council on Environmental Quality on 28 January 1975.

In 1978, the Inland Waterways Authorization Act (PL 95-502) was signed into law. Section 101 of the Act directed the Upper Mississippi River Basin Commission to prepare a Comprehensive Master Plan for the Management of the Upper Mississippi River System in cooperation with appropriate Federal, State, and local officials.

The Comprehensive Master Plan identified certain measures, both structural and nonstructural, that may lead to increases in navigation capacity. However, the proposed rehabilitation of Lock and Dam 21 covered by this Environmental Assessment includes maintenance and construction work to existing lock and dam features, such as concrete removal and replacement, steel work, sandblasting, painting, mechanical equipment replacement, and electrical equipment replacement. As a result, the rehabilitated facility will retain operating and performance characteristics similar to its original design. Hence, no changes in local or system river traffic or capacity can be attributed to the proposed rehabilitation addressed in this assessment. At such time that new features are proposed for the site, they will be evaluated as to their impact on local and system traffic and any resulting cumulative environmental impacts.

Reference Section VI, Compliance with Environmental Statutes Part D, Fish and Wildlife Coordination Act Report, contained in the correspondence attachment.

The U.S. Army Corps of Engineers, North Central and Lower Mississippi Valley Divisions; St. Paul, Rock Island, and St. Louis Districts are currently engaged in planning and construction activities on the Upper Mississippi and Illinois Rivers for the purpose of repairing and updating components of the navigation system on these rivers. Various site-specific environmental documents have been, or are being, prepared which discuss localized effects to natural and cultural resources from rehabilitation of Locks and Dams 2 through 22 on the Upper Mississippi River; and Lockport, O'Brien, Marseilles, Peoria, and LaGrange Locks and Dams on the Illinois River. An Environmental Impact Statement is now being developed which will address the cumulative effects of all of the foregoing actions. This document is being coordinated with Federal, State, and local agencies having interest or jurisdiction on the Upper Mississippi and Illinois Rivers.

I. PURPOSE AND NEED FOR ACTION. Completed in 1938, Lock and Dam 21 is approaching the 50-year lifespan typically estimated for concrete structures of this type. The location is shown on Plate 1 - Project Location. Damaged concrete, weathered steel components, and outdated electrical equipment necessitate certain repairs and improvements which are now beyond the scope of routine operation and maintenance activities. Potential failure of deteriorated structural components presents a safety hazard to lock personnel, towboat crews, the general public, and the riverine environment.

In order to reduce future maintenance costs and alleviate safety hazards at Lock and Dam 21, the U.S. Army Corps of Engineers has proposed a 3-year major rehabilitation project under the authority of the River and Harbor Act of 3 July 1930. This Act authorizes the Upper Mississippi River Nine-Foot Channel Navigation Project and its maintenance.

II. PROJECT DESCRIPTION. The proposed activity primarily involves a variety of construction-type work such as concrete removal and replacement, steel work, sandblasting, painting, mechanical equipment replacement, and electrical equipment replacement. Refer to Plate 2 - Proposed Rehabilitation. The facility is described as follows:

A. Navigation Lock. The lock chamber is 110 feet wide by 600 feet long, with a maximum lift of 10.5 feet. The lock walls and sills are of concrete construction. Miter type gates are provided at the upper and lower ends of the lock. The filling and emptying system is the wall-port type.

B. Dam. The dam has a total length of 2,960 feet and consists of 1,066 feet of gated section adjoining the lock, 200 feet of earthen embankment storage yard, 1,400 feet of submersible earthen dam, and 294 feet of nonsubmersible earthen dam. The gated portion of the dam contains three roller gates and 10 tainter gates.

The work proposed at this facility involves the following components:

A. Lock Walls. The lock walls will be repaired by removing the deteriorated concrete in the lock chamber and around the miter gates and replacing it with new concrete and armor. The armor will consist of horizontal runs of steel T-section and horizontal and vertical steel corner protection.

B. Guard Cell. A single sheet pile cell filled with concrete will be constructed downstream of the intermediate lock wall.

C. Main Lock Miter Gates. There are two sets of miter gates at the main lock. The upper gates are 27 feet high and the lower gates are 33 feet high. The gates are riveted steel frame structures covered with steel buckle plate. The upper and lower gates will be overhauled and painted.

D. Emergency/Auxiliary Lock Miter Gates. The emergency lock miter gates are a single gate set similar to the upper gates of the main lock, but are silted in on the upstream and downstream sides. The silt will be removed on the upstream and downstream sides of the miter gate, and the

gate leaves will be overhauled and painted. These gates were installed during original construction to provide a 6-foot draft structure for passage of emergency repair craft in the event of failure of the main lock. There will be no change in the use of these gates.

E. Main Lock Miter Gate Machinery. The existing machinery will be removed and replaced with new machinery.

F. Lock Tainter Valve Machinery. The existing machinery will be removed and replaced with new machinery and the tainter valves will be cleaned and painted.

G. Lock Electrical Equipment. The existing electrical equipment, including the lighting system, will be removed and replaced with new equipment.

H. Dam Structure. The dam piers will be repaired by removing the deteriorated concrete and replacing it with new concrete. The inside and outside of machinery boxes will be cleaned and painted. The operating houses will be rehabilitated by replacing the windows and repairing the deteriorated roof.

I. Roller Gates and Tainter Gates. The insides and outsides of the roller gates will be cleaned and painted, the side seal plates will be repaired, and the rubber seals will be replaced. The lower portion of the lifting chains will be replaced with a new manually lubricated chain.

J. Dam Electrical Equipment. The dam electrical distribution system, including the lighting system, will be completely replaced.

K. Service Bridge. The service bridge will be painted and the walkway replaced with a non-skid grating.

L. Emergency Bulkheads. The emergency bulkheads will be painted and the wood seals will be replaced with rubber seals.

M. Scour Protection. The scour protection will consist of derrick stone on rock fill. Below the dam, the rock fill will be 2.5 feet thick and extend 75 feet beyond the existing rock protection. The derrick stone will be placed on the rock fill at a thickness of 3.5 feet for a distance of 20 feet beyond the existing rock protection. Above the dam, the rock fill also will be 2.5 feet thick and extend 55 feet beyond the existing rock protection. The derrick stone above the dam will be placed on the rock fill at a thickness of 3.5 feet for a distance of 35 feet beyond the existing rock protection. (Refer to Plate 3 - Scour Protection.)

N. Storage Yard Tracks. The ties and ballast for the storage yard tracks will be replaced, and the loose deadman will be secured.

O. Storage Yard Embankment. The storage yard embankment consists of sand fill supported by a reinforced concrete abutment. The expansion joints for the abutment do not have water stops. The expansion joints will be sealed to prevent additional loss of sand fill.

P. Overflow Section. The 1,400-foot overflow section consists of a compacted fill embankment and 20-foot-diameter sheet pile cells. The embankment crown and slopes are covered with riprap stone. Voids in the slush concrete will be filled with grout, and a 6-inch layer of concrete with a reinforcing mat will be placed on top of the sheet pile cell embankment to prevent further deterioration.

III. ALTERNATIVES. Alternatives which were considered include:

A. Primary Rehabilitation.

1. No Federal Action. This alternative was not selected because the subject facility is approaching the limit of its serviceable life. Rehabilitation of the subject facility is authorized by the River and Harbor Act of 3 July 1930.

2. Rehabilitation of the Facility to Original Design Specifications or Criteria. This alternative was not selected because review of the subject facility under the Major Rehabilitation Program and the Dam Safety Assurance Program indicates that certain features are outdated and/or unsafe. This alternative would eliminate the need for dredging/excavation for scour protection extension.

3. Rehabilitation of the Facility to Updated Specifications and Criteria. This is the preferred alternative and was discussed in detail under "Project Description," preceding. This alternative involves construction of a single guard cell and extension of scour protection.

B. Dredging and Disposal Alternatives.

1. No Federal Action. This alternative was not selected due to requirements of other work features.

2. Hogback Island (GREAT 21.36). ^{1/} This site is located at Mississippi River mile 332. The site is a high use recreation area, and its use for disposal is restricted to beach nourishment. This limits the site's use to sandy material from scour protection excavation. This site is noted as site 4 on Plate 4 - Alternative Disposal Sites.

3. Agricultural Field, Missouri (GREAT 21.48). This site is located inside the levee at the western end of the dam. The site would be suitable for disposal of silt sediment, with sand sediments disposed of on the inner levee face. The property owner, however, is not believed to be amenable to use of this site at this time. This site is noted as site 3 on plate 4.

^{1/} GREAT is the acronym for Great River Environmental Action Team, which prepared a 1980 report entitled Channel Maintenance Handbook. This report identified historic, current, and potential future disposal sites for channel maintenance work. GREAT was composed of representatives from all Federal, State, and local agencies responsible for management of resources on the Upper Mississippi River, as well as representatives from public organizations and the towing industry.

4. Quinsippi Island. This "site" is located between river miles 327.3 and 327.8. The island has been recommended by the U.S. Fish and Wildlife Service (FWS), and the Quincy Park District has indicated the need for fill material for various projects on the island. Quinsippi Island is considered a suitable location for deposition of all materials dredged for the proposed project. This site is noted as site 2 on plate 4.

5. Commercial Landfill. This site is located about .5 mile upstream of the facility, within the corporate boundaries of the city of Quincy. The site is 30 acres in size and is operated under U.S. EPA Permit No. 1974-70-DE. This is anticipated to be the most economically and environmentally acceptable disposal site alternative. As such, this is the currently preferred disposal alternative. Permitted activities at this landfill are disposal of construction and wrecking debris, such as wood, rock, brick, and various granular fill. No household refuse or hazardous wastes are permitted. Also, the site may be filled to the existing top elevation of the adjacent levee. This site is noted as site 1 on plate 4.

IV. AFFECTED ENVIRONMENT

A. Natural Resources. The project site consists of Lock and Dam 21 and the immediate vicinity. The study area includes Pools 21 and 22, which may be considered the zone of influence for the subject facility.

Riverine resources, both aquatic and terrestrial, between Meyer, Illinois, and Saverton, Missouri, were considered during preparation of this report. Pools 21 and 22 are joined by the Wyaconda, Fabius, and North Rivers at river miles 337.2, 323.2, and 321, respectively.

Pool 21 contains over 5,400 acres of bottomland set aside in the National Wildlife Refuge System. Referred to as the Gardiner Division of the Mark Twain National Wildlife and Fish Refuge, this area is managed by the FWS for fish, wildlife, and recreation, along with the Corps of Engineers which provides recreational facilities and manages forest resources.

By maintaining minimum pool elevations for navigation, the Upper Mississippi River Nine-Foot Channel Navigation Project, Pools 21 and 22, provides fairly stable year-round water levels in the backwater complex between river miles 301.2 and 343. Impoundment of the Mississippi River by Lock and Dam 21 created a pool approximately 18 miles long, which currently provides a variety of permanent deep and shallow water aquatic habitat with associated riverine terrestrial habitat between Lock and Dam 20 at Canton, Missouri, and Lock and Dam 21 at Quincy, Illinois. In addition to being used by furbearers and waterfowl, the backwaters are important spawning areas for commercial and sport fish. Many temporary, or ephemeral, ponds are interspersed throughout the bottomlands and provide spawning, brooding, and rearing habitat for certain fish, amphibian, and reptile species. These species provide a forage base for mammal species such as raccoon, mink, and river otter, as well as wading bird species such as great blue heron, great egret, green heron, and yellow-crowned night heron.

Recent tow traffic through Lock 21 averaged approximately 8 to 9 tows per day. Lock 21 currently has the capability to accommodate winter traffic, and weather has permitted year-round use about 50 percent of the time. Tow traffic is typically limited through the winter months due to ice conditions from Lock and Dam 19 to the head of navigation. Generally, peaks in tow traffic at Lock 21 occur from March to May as fuels, fertilizer, and empty barges are moved to destinations upriver, and from October to December as agricultural commodities are moved downriver.

One area proposed for disposal, Quinsippi Island, is currently owned by the city of Quincy and has been subject to various development efforts during the past 100 years. At some points on the island, terrestrial habitat is open, park-like woodland with understory limited by the deep sand substrate. This sand was deposited among medium-aged silver maple and cottonwood during earlier disposal activities. Elsewhere, habitat is more typical silver maple-elm association bottomland forest, in varying stages of succession. Quinsippi Island disposal has been supplanted by the availability of a commercial landfill located near the facility.

B. Cultural Resources. Construction for the Upper Mississippi River Nine-Foot Channel Navigation Project began in the 1930's and was completed by the early 1940's. Most of the lock and dam complexes are at or very close to being 50 years old as of 1985. The GREAT II Study, completed in 1980, included a brief overview of the potential significance of the navigation system. Recommendation 5007 contained in the Cultural Resources Work Group Appendix (1980:85-89) indicates that "the creation of the navigation system is generally accepted as a major engineering event in American history" and that structures (including equipment) may have individual and collective (District) significance under historical, architectural, and/or engineering criteria. It was recommended that the Corps conduct a historical, architectural, and engineering study to assess the significance of the system as a network important in the transportation, economic, and engineering history of the Nation.

As a result of a historical survey contract awarded in 1984 to Rathbun Associates of Springfield, Illinois, their staff identified all properties at the lock and dam complexes that appear to be eligible for the National Register of Historic Places. Complexes as a whole were then evaluated, as was the entire Upper Mississippi River Nine-Foot Channel Navigation Project within the Rock Island District. Properties were sorted into Department of the Army historic preservation categories 1-5, and preservation recommendations were made in light of anticipated impacts from potential rehabilitation and hydropower projects.

Rathbun Associates staff determined that only 5 of the 83 individual buildings or structures at Lock and Dam Complexes 11-22 of the Upper Mississippi River Nine-Foot Channel Navigation Project have National Register significance. No Lock and Dam 21 features were included in this list.

Essentially, the State Historic Preservation Officers (SHPO) of Illinois, Iowa, and Missouri feel that the entire nine-foot navigation project is eligible for listing in the National Register primarily for historical, economic, and operational reasons. Architectural and engineering features appear to be secondary, although selected structures seem to be significant (e.g., Lock and Dam 19 Complex already listed).

The Iowa, Illinois, Wisconsin, and Missouri SHPO's have provided written responses to our request of 4 June 1985 for comments on eligibility, justifications for eligible properties, guidance concerning possible compliance strategies, and opinions on preservation (in-field and documentary) needs.

The staff member from the Advisory Council on Historic Preservation (ACHP) provided this information to NCR in a letter dated 21 June 1985. The ACHP position is that either the entire system is eligible or it is not, with the exception of several specifically referenced structures at Lock and Dam 19 which are already listed. Overall, there are no major objections to the major rehabilitation program event if all the locks and dams are considered eligible. Most rehabilitation actions will not adversely affect those characteristics upon which significance would be based. As long as the attributes of overall configuration and appearance are left intact, objections appear unlikely. Repair of expected and normal wear and "accommodations to modern traffic through minor changes" should not be a problem, although some SHPO/ACHP involvement would be warranted to insure overall sensitivity of treatment. Significant features would have to be rehabilitated in accordance with the Secretary of the Interior's Standards.

At the 4 June 1985 meeting, the SHPO staff members tentatively agreed with the overall ACHP philosophy. The District believes that the primary significance of the system lies in its operation and that it continues to function in response to changing needs and requirements of the Corps mission, technological advancements, and modern traffic characteristics. This philosophy is derived from historical trends in Federal management of the Upper Mississippi River dating back to the 19th century. Federal actions for navigation improvement and control reflect an evolutionary pattern of change and thus the District feels that the major rehabilitation program not only carries out inherent anticipated changes but provides the opportunity for a continued program of responsive and innovative improvement.

The major rehabilitation program merely extends the normal course of adaptive reuse and insures that the overall original intent for continued development is carried out. In a sense, the navigation system as an entity will never really be 50 years or complete at any given point in time. Continual modifications have occurred in the past, and a static condition is an unrealistic goal for the future that also is not in the public interest.

Proposed disposal site 3 is an approved Environmental Protection Agency landfill site. A coordination letter dated 12 February 1987 was sent to the Illinois SHPO requesting a No Effect determination for disposal site 3. Due to previous disturbance of the area associated with the landfill activities, the proposed disposal will not impact any significant historic properties. Personal communication with the Illinois SHPO's office on 6 March 1987 indicated concurrence with this finding. (Reference telephone conversation record, dated 6 March 1987, in the pertinent correspondence attachment.) If a different preferred disposal site is selected, additional coordination with the SHPO will be necessary.

V. ENVIRONMENTAL IMPACTS OF THE PREFERRED ACTION. Effects of the preferred action on natural and cultural resources are summarized in table EA-1.

TABLE EA-1

Effects of the Preferred Action
on Natural and Cultural Resources

<u>Types of Resources</u>	<u>Authorities</u>	<u>Measurement of Effects</u>
Air quality	Clean Air Act, as amended (42 U.S.C. 1657h-7 et seq.)	No significant effect
Areas of partic- ular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.)	Not present in planning area
Endangered and threatened species critical habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	No significant impacts anticipated
Fish and wildlife	Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.)	No significant effect
Floodplains	Executive Order 11988, Flood Plain Management	No significant effect
Historic and cultural properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.)	SHPO coordination for disposal area initiated; No Effect determina- tion requested. NRHP evaluation completed. MOA pending signature.
Prime and unique farmland	CEQ Memorandum of August 1, 1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environ- mental Policy Act	No significant effect
Water quality	Clean Water Act of 1977, as amended (33 U.S.C. 1251 et seq.)	No significant effect
Wetlands	Executive Order 11990, Protec- tion of Wetlands, Clean Water Act of 1977, as amended (42 U.S.C. 1857h-7 et seq.)	Present in planning area; preservation anticipated
Wild and scenic rivers	Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.)	Not present in planning area

A. Social Impacts of the Preferred Action.

1. Noise. The project consists of concrete resurfacing, machinery replacement, electrical equipment replacement, and structural metal repair at a large lock and dam facility. Actions incidental to completion of the above work include dredging of various materials around the subject facility, land-based disposal of dredged material, and placement of rock for improvement of scour protection. The city of Quincy, Illinois, is located near the project site and provides background noise from commercial and urban residential traffic. Background noise levels in the project area are limited to those produced by towboat activity and through-dam water flow. The Burlington Northern Railroad line, which passes through Quincy and the project site, provides temporary intense elevations in ambient noise.

No sensitive noise receptors, such as schools or hospitals, are located within one-half mile of the project site. The duration and frequency of noise, including activity at this site, is anticipated to be minimal. The relative isolation of the project site away from residential property indicates that social impacts from construction noise should be minimal. All such impacts would be temporary.

2. Displacement of People. No relocations would be necessitated by the project.

3. Aesthetic Values. The aesthetic appeal of any type of construction activity is low; however, construction will be temporary. The results of the proposed activity, e.g., concrete repair, machinery repair, and painting, should improve aesthetic values over the long term.

4. Desirable Community Growth. The existence of a cost-effective, efficient transportation system provided by the Upper Mississippi River locks and dams has provided stimulus for growth of the river communities and the entire Midwest region. Maintenance of this system will continue to provide growth opportunities.

5. Community Cohesion. Land surrounding the lock and dam is primarily agricultural or used for industrial, residential, or recreational purposes. Both a public use area and a sewage disposal plant are located within a half mile of the lock and dam. Approximately 40 homes are located within a 1-mile radius of the project site. No effect on community cohesion would be expected due to the limited residential development in the project vicinity.

B. Economic Impacts of the Preferred Action.

1. Property Values and Tax Revenues. No short-term effect on property values or tax revenues would be expected from the proposed project. Long-term effects would be related to community and regional growth.

2. Public Facilities and Services. Safety at Lock and Dam 21 would improve following the proposed rehabilitation of the facility. The rehabilitation would result in lowered probability of service interruptions for maintenance and repair, thus benefiting both commercial and recreational craft.

3. Employment. The proposed rehabilitation project would temporarily increase area employment during the construction phase. It is anticipated that fewer than 100 workers would be employed for the rehabilitation project, with approximately 85 percent of these being local hires. Long-term effects of the project on the permanent employment and labor force of the two-county area would be related to community and regional growth.

4. Business and Industrial Development. During the rehabilitation process an increase in business and industrial activity would be noticed. This increased activity would be attributable to the purchases made for the rehabilitation of the lock and dam. The increased business activity occurring from the temporary infusion of a small number of construction workers would be absorbed into the area without noticeable effect. Long-term effects would be related to community and regional growth. The rehabilitation of the lock and dam would require no business relocations.

5. Farm Displacement. No farm land would be affected by the proposed project.

6. Regional Growth. Effects on regional growth are anticipated to be negligible. However, failure to rehabilitate and maintain this facility would eventually result in a shutdown of the navigation system. This would, in turn, have a negative impact on regional growth.

C. Environmental Impacts of the Proposed Action.

1. Manmade Resources. Pools 21 and 22, above and below the project site, respectively, may be considered manmade resources inasmuch as they are natural resources modified by man to facilitate waterborne commerce on the Upper Mississippi River. They are created and controlled by operation of the subject facility in concert with other components of the Upper Mississippi River Nine-Foot Channel Navigation Project. The subject facility is a manmade resource and is a vital part of the national infrastructure.

At this time, rehabilitation of the subject facility is anticipated to maintain existing navigation conditions in Pools 21 and 22. Completion of the subject project should contribute to alleviation of existing problems involving degradation of manmade resources of the Upper Mississippi River Nine-Foot Channel Navigation Project.

2. Natural Resources. The majority of project activities will take place on the facility structure itself, and therefore will have negligible effect on natural resources. Potential sources of impacts from a project of this nature involve sandblast residue, paint-solvent overspray, concrete debris, and metal scrap. Other materials to be removed from the project site are asbestos insulating coverings from electrical components and polychlorinated biphenyl (PCB) contaminants contained on electrical transformers. These materials are being removed under a separate project involving rehabilitation of the control house (lock house). This work is

being coordinated with the U.S. Environmental Protection Agency. The U.S. Army Corps of Engineers, Rock Island District, will maintain all applicable records and manifests for identification and disposal of these materials. Sandblast residue and paint overspray will be controlled by the use of tarps or other containment devices. Concrete debris and metal scrap will be removed and disposed of in compliance with applicable statutes.

Dredging activities at the emergency lock area will destroy existing benthic populations. Composed primarily of accreted silt and clay, this benthic substrate would typically support a community of burrowing invertebrates such as mayfly larvae, chironomids, and diptera larvae. Following dredging and rehabilitation activities, sediment accretion is anticipated to resume on the upstream side of the emergency miter gates. This area would typically be recolonized by invertebrates shortly thereafter. Sediment accretions on the downstream side of the emergency miter gates also are anticipated to resume.

Dredging activities above and below the dam will destroy existing benthic conditions at those areas. However, current velocities and flow patterns immediately above and below roller or tainter gate dams limit bottom dwelling organisms to crevice-inhabiting invertebrates such as mayfly and caddisfly larvae. These forms survive in interstitial spaces provided by scour protection rock and adjacent coarse substrate.

Substrate to be dredged upstream and downstream of the dam consists primarily of hard-packed sand, and, as such, would typically provide little usable habitat for anything other than burrowing invertebrates. It is anticipated that excavation of the existing substrate and subsequent replacement with rock fill will improve available invertebrate habitat and spawning and foraging habitat for certain fish species.

Where no excavation is necessary, scour protection rock will be used to line, or armor, existing contours below the dam. No fishery habitat beyond the dam foundation, in the form of scour holes, will be lost to filling.

Dredging of silty material from the auxiliary lock area is currently planned to be done with a deck-mounted crane and clamshell bucket. Dredging of material above and below the dam may be done as above or with a hydraulic cutterhead dredge. It is currently proposed that all dredged or excavated materials be disposed of at a commercial landfill located between .25 and .5 mile upstream of the lock (Illinois side).

Bulk sediment analysis results are contained in table 5 of the attached Section 404(b)(1) Evaluation, with discussion in the text of that document. Impacts to wildlife are considered negligible due to the location (landfill) and ultimate use of the location (commercial development).

Wildlife use of the disposal area is primarily by transient herpetofauna, birds, and small mammals. The availability of similar habitat nearby and eventual landscaping and construction indicate that effects of dredged disposal will be minimal and temporary.

Winter work at Lock and Dam 21 may disrupt foraging behavior of migratory, or winter resident, bald eagles. The availability of other foraging areas at Locks and Dams 20 and 22 indicates that foraging at Lock and Dam 21 is not critical to survival of that species.

3. Cultural Resources. Federal agencies are directed to find ways to avoid impacts if prudent and feasible measures can be found. Likewise, Federal agencies also are required to repair and maintain significant (or potentially significant) historic properties under their jurisdiction. Overall, the major rehabilitation program has been formulated to achieve both of these mandates. Most of the rehabilitation actions are minor in scope and will have no adverse effect on characteristics which contribute to the significance of the navigation system as a whole or individual structures within it.

Rehabilitation actions generally can be defined as major repair and maintenance items expected as a result of long-term wear and deterioration of aged features. These and the improvement actions will not appreciably affect the overall appearance and operation of the navigation system. Many of the actions are necessary to insure continued safe and efficient operation. Concrete, armor, and painting rehabilitation actions will preserve existing conditions. Window, roof, and door replacements will be treated with sensitivity to preserve the overall appearance of the structures involved. The Secretary of the Interior's Standards (and the ACHP's Manual of Mitigation Measures, if applicable) will be used when developing plans and specifications. Electrical/mechanical work will be internal and not visually observable for the most part. The major change will be the placement of one concrete-filled sheet pile cell downstream of the intermediate wall, but this will not alter the existing walls and the cell could be removed in the future if a return to the original condition is desired.

The ACHP defines "effect" as "any condition of the undertaking [which] causes or may cause any change, beneficial or adverse, in the quality of the historical, architectural, archeological, or cultural characteristics that qualify the property to meet the criteria of the National Register (36 CFR part 800.3(a))." Undertakings may affect visual, available, or atmospheric elements that alter characteristics such as integrity of location, design, feeling, materials, workmanship, or setting. Secondary impacts also might occur such as construction of new facilities incongruent with the "as-listed" character of historic properties. This occurrence also could be viewed as a continuation of the natural course of navigation system evolution and in a sense a contribution to overall significance on a broader scale.

Because of the nature of major rehabilitation plans, Criteria 2, 4, and 5 (36 CFR Part 800) do not apply. Criterion 1 applies because some minor alterations will occur, and Criterion 3 would apply primarily to guidewall extensions which are not part of this action as proposed. For the most part, rehabilitation actions will be unobtrusive, not visible to the public, and will not affect those characteristics which contribute to National Register significance. Beneficial effects that will accrue include the general upkeep of the system and the extension of its operating life. Safety, national defense, energy efficiency, and economic benefits are

not strictly historical but certainly in the public interest. These benefits are those for which the system was constructed in the first place and thus become intangible elements contributing to the overall significance of the system.

4. Air Quality. Impacts to air quality will occur from exhaust emissions, volatile paint solvents, fugitive particles from sandblasting, and dust particles from concrete removal and rock placement. These impacts will be temporary and will not result in significant or permanent violations of air quality standards.

5. Water Quality. Construction materials will consist of physically stable and chemically noncontaminating materials such as corrosion-resistant steel, concrete, and quarried limestone rock. The placement and use of these materials will require processing under Sections 401 and 404 of the Clean Water Act. A Section 404(b)(1) Evaluation has been prepared and is attached to this report. Section 401 certification or waiver will be obtained from Illinois and Missouri agencies, as appropriate.

Placement of construction materials and resuspension of normal bottom materials will contribute to localized temporary elevations in turbidity. While the contractor will be bound by the requirements and conditions set forth in Guide Specification, Civil Works Construction for Environmental Protection, CW-1430, July 1978, Section 7.3, certain loss of paint chips, residue, and other materials to the aquatic environment at the construction site is inevitable. Any effects, however, are anticipated to be minimal and short term.

VI. COMPLIANCE WITH ENVIRONMENTAL QUALITY STATUTES. Compliance is summarized in table EA-2.

A. Endangered Species. As indicated in the Fish and Wildlife Coordination Act Report (FWCAR), dated 30 September 1986, four federally endangered species may utilize the project area: Indiana bat (Myotis sodalis), bald eagle (Haliaeetus leucocephalus), Higgins' eye pearly mussel (Lampsilis higginsii), and fat pocketbook pearly mussel (Potamilus capax). The following discussion constitutes the Biological Assessment (BA) for this project. As mentioned on page EA-1, no increase in navigation capacity is anticipated for the project action. Therefore, no system-wide impact or effect beyond maintenance of existing conditions is anticipated.

Habitat components required by the Indiana bat include: caves for winter hibernaculae; a small stream system with an overhanging closed tree canopy for summer foraging; and larger, overmature trees with exfoliating bark for spring to fall roosting and brooding. The lack of the above habitat types at the immediate project site precludes significant impact from the majority of work. Habitat presence at proposed disposal sites is limited to large, overmature trees which may stand along the potential alignment of access for the dredged material-handling machinery. No large, overmature trees with exfoliating bark or apparent cavities will be cut for placement of discharge pipe; pipe alignment will be planned to minimize tree removal in general.

TABLE EA-2

Relationship of Plans to Environmental Protection
Statutes and Other Environmental Requirements

<u>Federal Policies</u>	<u>Compliance</u>
Archaeological and Historic Preservation Act, 16 U.S.C. 469, et seq.	Full compliance
Clean Air Act, as amended, 42 U.S.C. 1857h-7, et seq.	Full compliance
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	Full compliance
Coastal Zone Management Act, 16 U.S.C. 1451, et seq.	Not applicable
Endangered Species Act, 16 U.S.C. 1531, et seq.	Full compliance
Estuary Protection Act, 16 U.S.C. 1221, et seq.	Not applicable
Federal Water Project Recreation Act, 16 U.S.C. 460-1(12), et seq.	Full compliance
Fish and Wildlife Coordination Act, 16 U.S.C. 601, et seq.	Full compliance
Land and Water Conservation Fund Act, 16 U.S.C. 460/-460/-11, et seq.	Not applicable
Marine Protection Research and Sanctuary Act, 33 U.S.C. 1401, et seq.	Not applicable
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	Full compliance
National Historic Preservation Act, 16 U.S.C. 470a, et seq.	Full compliance
River and Harbor Act, 33 U.S.C. 403, et seq.	Full compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	Not applicable
Wild and Scenic Rivers Act, 16 U.S.C. 1271, et seq.	Full compliance
Flood Plain Management (Executive Order 11988)	Full compliance
Protection of Wetlands (Executive Order 11990)	Full compliance
Environmental Effects Abroad of Major Federal Actions (Executive Order 12114)	Not applicable
Farmland Protection Act	Full compliance
Analysis of Impacts on Prime and Unique Farmland (CEQ Memorandum, 11 Aug 80)	Full compliance

NOTES

1. Full compliance. Having met all requirements of the statute for the current stage of planning (either preauthorization or postauthorization).
2. Partial compliance. Not having met some of the requirements that normally are met in the current stage of planning. Partial compliance entries should be explained in appropriate places in the report and referenced in the table.
3. Noncompliance. Violation of a requirement of the statute. Noncompliance entries should be explained in appropriate places in the report and referenced in the table.
4. Not applicable. No requirements for the statute required; compliance for the current stage of planning.

No caves are present in the project area, nor would any project activity disturb winter hibernaculae. It is currently anticipated to dredge for different phases of the project at different times of the year. Since no Indiana bats are documented for the project area, and required habitat components are negligibly represented at the project site and proposed dredged disposal areas, no effects to resident or migratory Indiana bats are anticipated.

Bald eagles are generally limited to winter residency in the project area. Eagle use has varied from 4 during the mild winter of 1985-1986 to 210 during the winter of 1978-1979. Temporary disruption of eagle foraging behavior is the primary potential effect of construction activity around the project site. There are no records of eagle nesting in the project area. Given the mobility of the species and the proximity of similar available foraging habitat 18 miles upstream and 24 miles downstream, it is anticipated that disturbance of foraging birds will not affect the wintering bald eagle population.

No Higgins' eye or fat pocketbook pearly mussels have been documented in the project area. Benthic disturbance in the tailwater area of the project facility is anticipated to have no effect on endangered mussel species as well as other mussels. Mussel bed locations were taken from the FWS's Resources Inventory for the Upper Mississippi River, Guttenberg, Iowa, to Saverton, Missouri (1984).

Consultation with FWS staff regarding habitat requirements for Higgins' eye and fat pocketbook mussels indicates that substrate stability and flowing water are the basic conditions necessary for their existence. Although characterized as a large river species, little specific information is available on the Higgins' eye and its ecology. It has been collected in depths of 10 to 20 feet on substrates of stable sand and mud. Its host fish is the sauger. The fat pocketbook has been collected on substrate grades ranging from mud to fine gravel, in depths from a few inches to more than 8 feet. Its life cycle is unknown.

State endangered species information was solicited from the States of Illinois and Missouri by the Rock Island District, Corps of Engineers, and also was consolidated by the FWS, as provided in their Coordination Act Report for this project:

<u>Species</u>	<u>Scientific Name</u>	<u>Missouri</u>	<u>Illinois</u>
Double-crested cormorant	<u>Phalacrocorax auritus</u>	endangered	-
Cooper's hawk	<u>Accipiter cooperii</u>	endangered	-
Henslow's sparrow	<u>Ammodrammus henslowii</u>	-	threatened
Bald eagle	<u>Haliaeetus leucocephalus</u>	rare	-
Gray bat	<u>Myotis grisescens</u>	endangered	endangered
Yellow mud turtle	<u>Kinosternon flavescens</u>	rare	-
Smooth green snake	<u>Opheodrys vernalis</u>	rare	-

<u>Species</u>	<u>Scientific Name</u>	<u>Missouri</u>	<u>Illinois</u>
Massasauga	<u>Sistrurus catenatus</u>	rare	-
Hickory nut	<u>Obovaria olivaria</u>	rare	-
Warty-back	<u>Quadrula nodulata</u>	rare	-
Lake sturgeon	<u>Acipenser fulvescens</u>	endangered	-
Burbot	<u>Lota lota</u>	rare	-
Narrow-leaved green milkweed	<u>Asclepias stenophylla</u>	-	threatened
--	<u>Aster paludosus</u> subsp. <u>hemisphericus</u>	rare	-
--	<u>Flaveria campestris</u>	endangered	-
Pineweed	<u>Lechea racemulosa</u>	Undetermined	-
Red-berried elder	<u>Sambucus pubens</u>	rare	-
Amethyst shooting star	<u>Dodecatheon radicans</u>	rare	-
Sedge	<u>Carex communis</u>	-	endangered
Sedge	<u>Carex parasina</u>	-	endangered
Prairie white- fringed orchid	<u>Habenaria leucophaea</u>	-	endangered
Golden seal	<u>Hydrastis canadensis</u>	-	threatened
Prairie clover	<u>Lespedeza leptostachya</u>	-	endangered
Ginseng	<u>Panax quinquefolius</u>	-	threatened
Arching dewberry	<u>Rubus enslenii</u>	-	endangered
Prairie spiderwort	<u>Tradescantia bracteata</u>	-	endangered
Buffalo clover	<u>Trifolium reflexum</u>	-	endangered
Green trillium	<u>Trillium viride</u>	-	threatened
Rock elm	<u>Ulmus thomasi</u>	-	threatened
False hellebore	<u>Veratrum woodii</u>	-	threatened
Arrowwood	<u>Viburnum molle</u>	-	endangered

Because most of the proposed work will take place on or around the lock and dam itself, and because dredged disposal will take place on upland, previously disturbed habitat, no impacts are anticipated to be incurred by any of these species. The aquatic habitats to be altered by rock placement at the dam, and cell construction below the intermediate wall at the lock, are not considered to provide habitat for any of the aquatic species in question. For these reasons, no impacts to State or federally listed endangered species are anticipated.

B. Cultural Resources. Between 1980 and 1984, the Rock Island District received several objections from SHPO's on rehabilitation and hydropower projects. Objections were rooted in the fact that the cultural study had not been done and therefore no basis for evaluating effects pursuant to Section 106 was available.

In response to SHPO objections and Federal mandates to identify and evaluate historic properties, a contract was awarded to Rathbun Associates of Springfield, Illinois, in May of 1984 to complete the necessary historical, architectural, and engineering study through a comprehensive documents search, field evaluations, and Level IV HABS/HAER documentation. Preliminary National Register evaluations were developed in accordance with 36 CFR,

Parts 60 and 63, supplemented by Department of the Army historic preservation guidelines contained in AR 200-1, AR 420-40, and Technical Manual 5-801-1. Preservation recommendations also were developed for specific lock and dam complexes and individual structures based upon the significance evaluations. These recommendations were developed utilizing the above regulations and the Secretary of the Interior's standards for rehabilitation projects (National Park Service 1983; Heritage Conservation Service 1979). Copies of the draft report have been distributed to the appropriate SHPO's (IL, IA, MN, WI), Corps elements (NCD, NCS, LMV, LMS), and the ACHP for review and comment.

Coordination between four SHPO offices and the two Federal agencies was a fairly complex procedure. The process was further complicated by the fact that the Upper Mississippi River Nine-Foot Channel Navigation Project as a whole falls under the jurisdiction of three Corps districts from two separate divisions. Hence, two meetings were held at the Rock Island District to discuss the study results, National Register eligibility issues, and possible compliance issues related to the major rehabilitation program.

The first meeting was held on 4 October 1984, just prior to submission of the draft report. Rathbun Associates staff made a presentation to Rock Island District staff and SHPO staffs from Iowa and Illinois. Because of problems in obtaining review comments and the complexity of issues involved, a second meeting was held on 4 June 1985. In addition to Corps staff from the Rock Island and St. Paul Districts, SHPO presentation included the States of Missouri, Iowa, and Illinois (Wisconsin declined to participate, as did St. Louis District, Corps of Engineers).

A cultural resources overview report with PMOA was prepared to provide for the necessary coordination and project planning for Locks and Dams 11 through 22 pursuant to the National Historic Preservation Act and related guidelines and implementing regulations. This report is available for review by interested parties. In October 1986, the St. Paul District indicated an interest in being included in the PMOA. This would add Locks and Dams 3 through 10 to the agreement. The ACHP currently is preparing a revised PMOA for Locks and Dams 3 through 22 for Corps and SHPO consideration. The District will update the SHPO and ACHP on disposal site survey results, as appropriate.

C. Federal Water Project Recreation Act. The construction of the proposed project would have no effect on provisions of this act.

D. Fish and Wildlife Coordination Act. The project is being coordinated with the U.S. Fish and Wildlife Service, the Illinois Department of Conservation, the Missouri Departments of Conservation and Natural Resources, and other interested agencies and organizations. The FWCAR, dated 30 September 1986, is located in the pertinent correspondence

attachment of this report. Since completion of the FWCAR, additional coordination meetings have been held between the District and FWS in an attempt to resolve concerns.

The FWS included the following recommendations in the FWCAR for the project:

1. Evaluate the potential of the guardcell to increase tow locking efficiency.

District Response: The Rock Island District has evaluated traffic information from Lock and Dam 22, where a lower approach guardcell has been in place since 1983. This information was used for evaluation of the proposed guardcell at the subject facility. Reference letter dated 5 December 1986, contained in the Pertinent Correspondence attachment. No effect on traffic level was found to result from guardcell installation.

2. No bottomland hardwoods be cleared.

District Response: While certain areas of Quinsippi Island contain what may be considered bottomland hardwoods, most disposal sites proposed have been previously disturbed and will eventually be altered by the city of Quincy, with or without the proposed disposal actions. In addition, the city intends to maintain tracts on Quinsippi Island as natural areas for interpretive purposes. A certain amount of tree clearing will be unavoidable; however, clearing will be minimized where possible.

3. All submerged riprap be 3 to 4 feet in diameter or greater.

District Response: Design criteria call for the use of the largest grade stone feasible to stabilize bedding rock and rockfill. Riprap 3 to 4 feet in diameter or greater requires special handling and equipment for placement. While we recognize the benefits of large stone, it will only be used where necessary for rockfill stabilization. The extra floating plant, boat activity, and associated fuel consumption required for extensive use of derrick stone present other environmental and economic problems.

4. Resurfacing of the earthen dike be done in such a manner as to not prevent fishermen access.

District Response: Concur.

5. Means be investigated to improve walk-in fishing access.

District Response: Concur, within legal/liability constraints posed by operation of the subject facility.

6. This project be included in an analysis of the possible increases in tow traffic (see our letter of April 7, 1986). As stated previously, this should be a cumulative assessment and should include all proposed rehabilitation work and the Second Lock proposed for Lock and Dam 26(R).

District Response: An Environmental Impact Statement is being prepared to address the potential for cumulative impacts from certain measures of the major rehabilitation effort. The major rehabilitation effort and the second lock at Lock and Dam 26(R) are independent actions, under separate jurisdiction. Each action is independently justified, and each will take place totally independent of the other.

7. Perform a composite analysis of the sediments in the auxiliary lock chamber to determine organic and metal content.

District Response: This was accomplished in September 1986. Information regarding sediment, elutriate, and ambient water testing has been provided to appropriate State agency staff during coordination of dredged disposal activities.

8. Assuming no significant pollutants in the sediments, dredged material could be barged to Quinsippi Island. Actual selection of disposal sites should be coordinated with the Illinois Department of Conservation and this office. All unavoidable habitat losses due to disposal will require adequate compensation.

District Response: This disposal alternative has been supplanted by the use of an EPA-approved commercial landfill.

9. Conduct work in the tailwaters in late fall or winter to minimize interference with sport fishing.

District Response: Late fall work in the tailwaters will be contingent on river stages and flow at the time of proposed work. Winter tailwater work will be minimized to avoid disturbance to wintering bald eagles.

10. Employ means to minimize the impacts to water quality from the paint residue that enters the river during the sandblasting of gates and from the dredging of the auxiliary lock chamber.

District Response: Guide Specification, Civil Works Construction for Environmental Protection, CW-1430 July 1978, provides for submission of an environmental protection plan by successful contractors. Further guidelines in this document call for the Protection of Water Resources (Sec. 7.3), Protection of Fish and Wildlife Resources, (Sec. 7.4) and Protection of Air Resources (Sec. 7.5). Rock Island District staff will review the Environmental Protection Plan submitted for this project to ensure adequacy of the plan prior to commencement of project activities. District staff also will monitor construction work to ensure adherence to conditions of the plan.

During the coordination process, the Rock Island District has provided various Federal and State agencies with information regarding the subject project, and the major rehabilitation program as a whole. Meetings were held with local and regional FWS staff to resolve concerns regarding potential navigation capacity and traffic increases presumed by that agency and involved State agencies. As a result of this coordination effort, the

Rock Island District has initiated economic and environmental studies beyond individual lock and dam rehabilitation projects, encompassing the overall rehabilitation program on the Upper Mississippi River, including the Illinois Waterway.

As agreed upon by the Corps of Engineers and the FWS, site-specific environmental assessments are being prepared for those features of the major rehabilitation effort that do not have the potential to increase navigation traffic and cause cumulative environmental impacts on the Upper Mississippi River and Illinois Waterway. In addition, the Corps of Engineers has agreed to prepare an additional NEPA document which will assess the potential for cumulative environmental impacts for those rehabilitation features the FWS has identified as possibly allowing or causing an increase in navigation traffic, from Locks and Dams 2 through 22 on the Mississippi River, as well as the locks and dams on the Illinois Waterway. The Rock Island, St. Paul, and St. Louis Districts, as well as the North Central and Lower Mississippi Valley Divisions of the Corps of Engineers, have been meeting to discuss the format and schedule for preparation of such a document. The scoping process for this Environmental Impact Statement (EIS) involving Federal and State agencies, other groups, and the public will begin in the near future. The draft EIS is scheduled to be released for public review in March 1988.

E. Wild and Scenic Rivers Act. No rivers listed as "wild and scenic" or rivers in the inventory for listing as "wild and scenic" will be affected by the project.

F. Executive Order 11988 (Flood Plain Management). Executive Order 11988 directs Federal agencies to: (1) avoid development in the floodplain unless it is the only practical alternative; (2) reduce the hazards and risks associated with floods; (3) minimize the impact of floods on human safety, health, and welfare; and (4) restore and preserve the natural and beneficial values of the floodplain. The proposed action is in accordance with Executive Order 11988.

G. Executive Order 11990 (Protection of Wetlands). Executive Order 11990 directs Federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when a practicable alternative exists. Wetland definitions may apply to bottomland and shoreline areas within the project area. No wetland or bottomland hardwood areas will be affected by the project as currently proposed. The project site was adjacent to an industrialized urban area which contains the preferred disposal site, a commercial landfill. Access to the landfill is provided by the lock and dam access road. No disposal activities will proceed without concurrence of Federal and State agencies in support of all applicable permits.

H. Clean Water Act. The project design will incorporate features to minimize impacts to water quality. Fill material is being deposited in the aforementioned watercourse with some return water from disposal areas anticipated; therefore, processing under Sections 401 and 404 of this act is being pursued.

I. Clean Air Act. Exhaust fumes and fugitive dust particles from construction equipment and activities would produce moderate, temporary air quality impacts. No long-term impact to air quality is anticipated by the project action.

VII. ENVIRONMENTAL IMPACTS OF THE OTHER ALTERNATIVES.

A. Primary Rehabilitation.

1. No Action. This alternative would allow the deterioration of the subject facility to a potentially inoperable condition. Impacts could be incurred through loss of pool, flooding, rerouting of commodities to land-based transport, either short-haul around the facility or long-haul to final destination points, and a variety of other consequential activities resulting from instability of Pool 21 and the remainder of the waterway system. Sediment would continue to fill the emergency lock, and scour hole development around the dam would continue. Regulation of Pool 22 would be hindered by lack of control at Dam 21.

2. Rehabilitation of the Facility to Original Design Specifications or Criteria. Other than essentially the same short-term effects as noted for the preferred alternative 3, there would be no overall change from existing conditions. Continued operation without a guardcell would contribute to the likelihood of serious towing and recreational accidents.

B. Dredging and Disposal.

1. No Federal Action. Existing conditions would remain unchanged. Sedimentation would continue to fill the emergency lock area.

2. Hogback Island (GREAT 21.36). This site is approximately 7 miles away, with use currently restricted to beach nourishment, that is, relatively pure sand disposal only. The material to be removed from the dam pool and tailwater areas is anticipated to contain a variety of coarse materials in addition to sand. This material and the fine material from the auxiliary lock area are not suitable for beach nourishment. The site is a high use recreation area for local boaters. The addition of coarse and fine material could render the site unusable for this purpose. Wildlife use of this area is limited due to lack of cover and human activity; therefore, impacts to wildlife would be anticipated to be minimal.

3. Agricultural Field, Missouri (GREAT 21.48). This site is located inside the West Quincy Levee at the western end of the dam. The site would be suitable for disposal of silty sediment, with sand disposal on the inner levee face. Wildlife use of the actual field is limited to the growing season. However, wildlife use of the levee is fairly high, due to its location between the riverine forest on the outside of the levee and the agricultural area to the inside.

Uncultivated portions of land along the inner levee toe currently support mixed prickly lettuce, ragweed sedges, and goldenrod. Intergrading with the sand levee face, these weeds become mixed with partridge pea, sandbur, velvet leaf, and various dry site grasses. This habitat would support a variety of ground nesting birds as well as provide foraging and travel lanes for other wildlife.

4. Quinsippi Island. Dredging and disposal of silty material from the emergency lock area would be carried out by a deck-mounted crane and clamshell bucket. The material would be placed on barges and moved to Quinsippi Island where it would be used by the Quincy Park District for fill material at proposed development sites. Dredging and disposal of sandy material from the dam area may be done hydraulically. This material would be barged to a site specified by the city of Quincy for eventual use in municipal park development.

Bulk sediment analysis results are contained in table 5 of the attached Section 404(b)(1) Evaluation, with discussion in the text of that document. Impacts to wildlife are considered negligible due to the location (development area) and ultimate use of the location (commercial development landfill site).

Wildlife use of these areas is primarily by herpetofauna, birds, and small mammals. The availability of similar habitat nearby and eventual landscaping and revegetation indicate that effects of sand disposal would be minimal and temporary.

The levee at this site was constructed in 1963. Given the slow vegetation succession on sand, it may be anticipated that covering a portion of the existing levee with sand material would result in a 5- to 20-year recovery time for plant species. Silt disposal on the agricultural field would affect crop/cover development for one growing season. This site is currently under private ownership, with the exception of the levee. The landowner is not believed to be amenable to use of this site at this time.

VIII. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED.

Dredge work, rock placement, and activities by work vessels will disrupt the local aquatic environment at Lock and Dam 21, as will guard cell construction. Benthic constituents inhabiting the work areas will be destroyed. The period of aesthetic effect from dredged disposal will depend on plans by the landfill owner, who intends to use the disposal site for commercial development projects. Temporary impacts to air and water quality are unavoidable.

IX. RELATIONSHIP BETWEEN SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY. As a vital component in the national transportation infrastructure, Lock and Dam 21 will continue to serve navigation interests, as well as maintain 18 miles of pooled river aquatic and terrestrial habitat. Without the short-term use of the environment for rehabilitation activities, Lock and Dam 21 will continue to deteriorate, eventually reaching unsalvageable condition.

X. ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IF THE PROPOSED ACTION SHOULD BE IMFLEMENTED. The property currently occupied by the lock and dam, and the formerly unpooled 18 miles of riverine habitat (pre-1930's condition) should be considered irretrievable for the life of the project. Time, labor, fuel and other necessary construction materials also are irretrievable commitments.

XI. RELATIONSHIP OF THE PROPOSED PROJECT TO LAND-USE PLANS. The operation and maintenance of Lock and Dam 21 does not conflict with any known Federal, State, or local land-use plans.

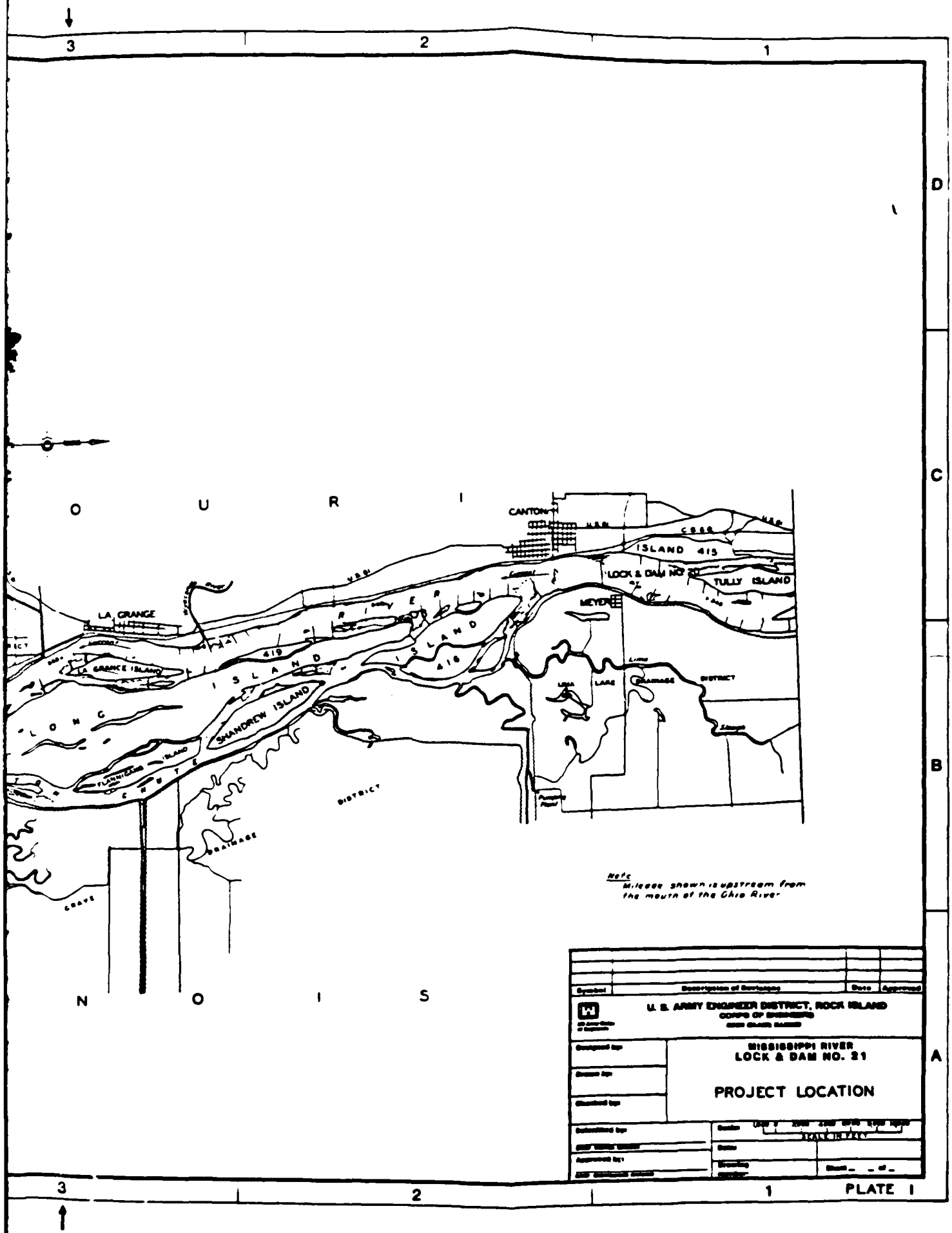
XII. CONCLUSIONS, CONTRIBUTION TO CUMULATIVE SYSTEM EFFECTS. Environmental effects should not be significant. The project design will incorporate features to minimize or avoid impacts to natural and cultural resources. Dredge material disposal has been, and will be, coordinated with appropriate Federal and State agencies. No project activities will take place prior to certification, or waiver of certification, under applicable purvues of the Clean Water Act.

The proposed rehabilitation of Lock and Dam 21 primarily involves maintenance and construction work to existing lock and dam features, such as concrete removal and replacement, steel work, sandblasting, painting, mechanical equipment replacement, and electrical equipment replacement. In addition to this work, the proposed rehabilitation includes construction of a sheet pile guard cell to be located approximately 100 to 125 feet downstream of the lower intermediate lock wall. It is anticipated that construction of this guard cell will not affect the performance or operating characteristics of the lock and dam system, other than providing an increased margin of safety for upbound approaching tows. This conclusion is supported by analysis of historical performance statistics at a similar lock and dam where such a guard cell was recently constructed.

Performance monitoring system (PMS) data indicate no difference in approach time for upbound tows between the with- and without-guard cell conditions. With the cell in place, however, the number of accidents involving the lock structure and upbound approaching tows was dramatically reduced. Based on this analysis, the rehabilitated structures will retain operating and performance characteristics similar to their original design. Hence, no changes in local or system river traffic or capacity can be attributed to either the construction of the guard cell or rehabilitation of the existing features of the lock and dam. At such time that new features are proposed for this site, they will be evaluated as to their impact on local and system traffic and capacity.

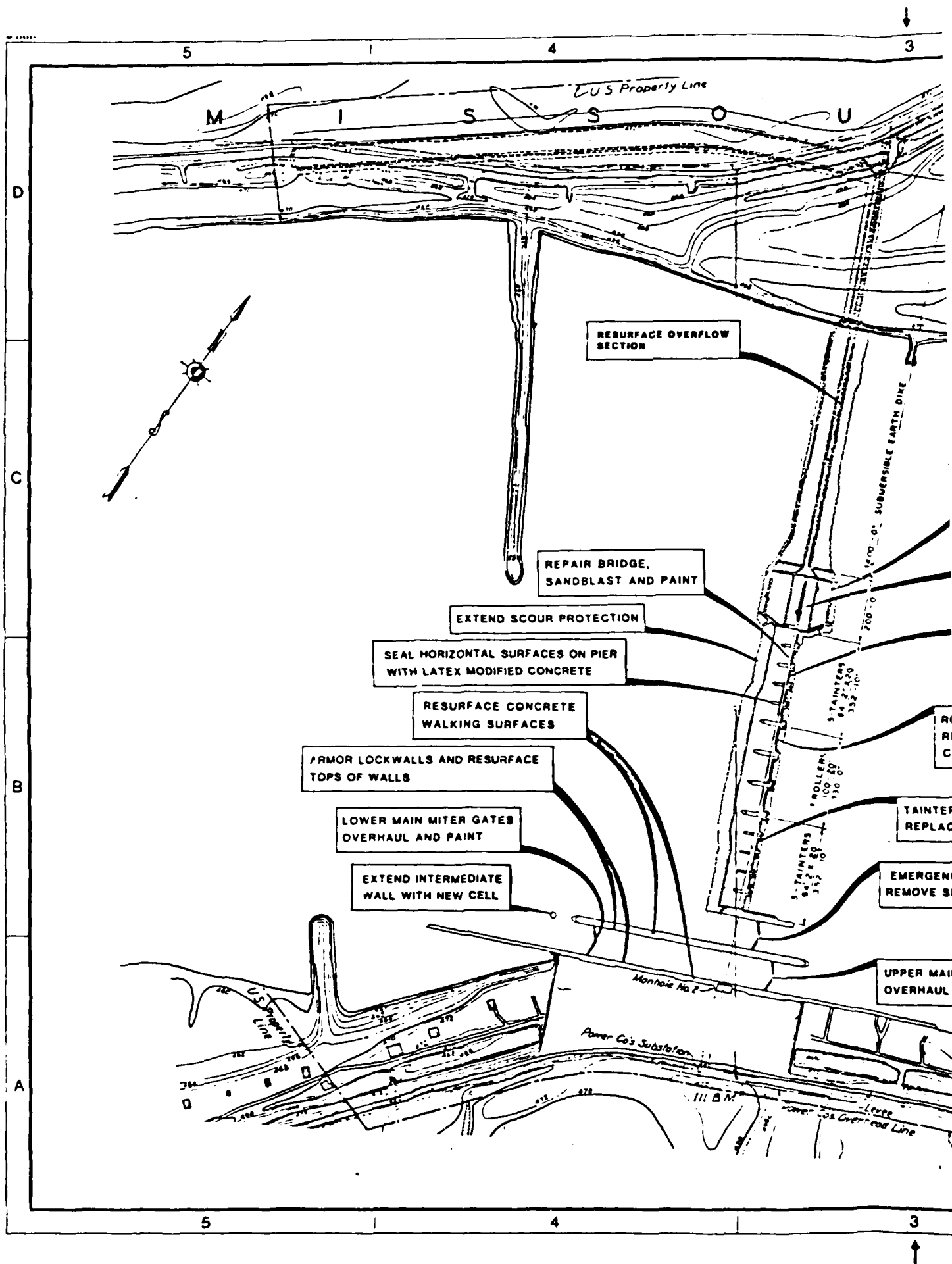
XIII. COORDINATION. Coordination for the project will be maintained with the following State and Federal agencies:

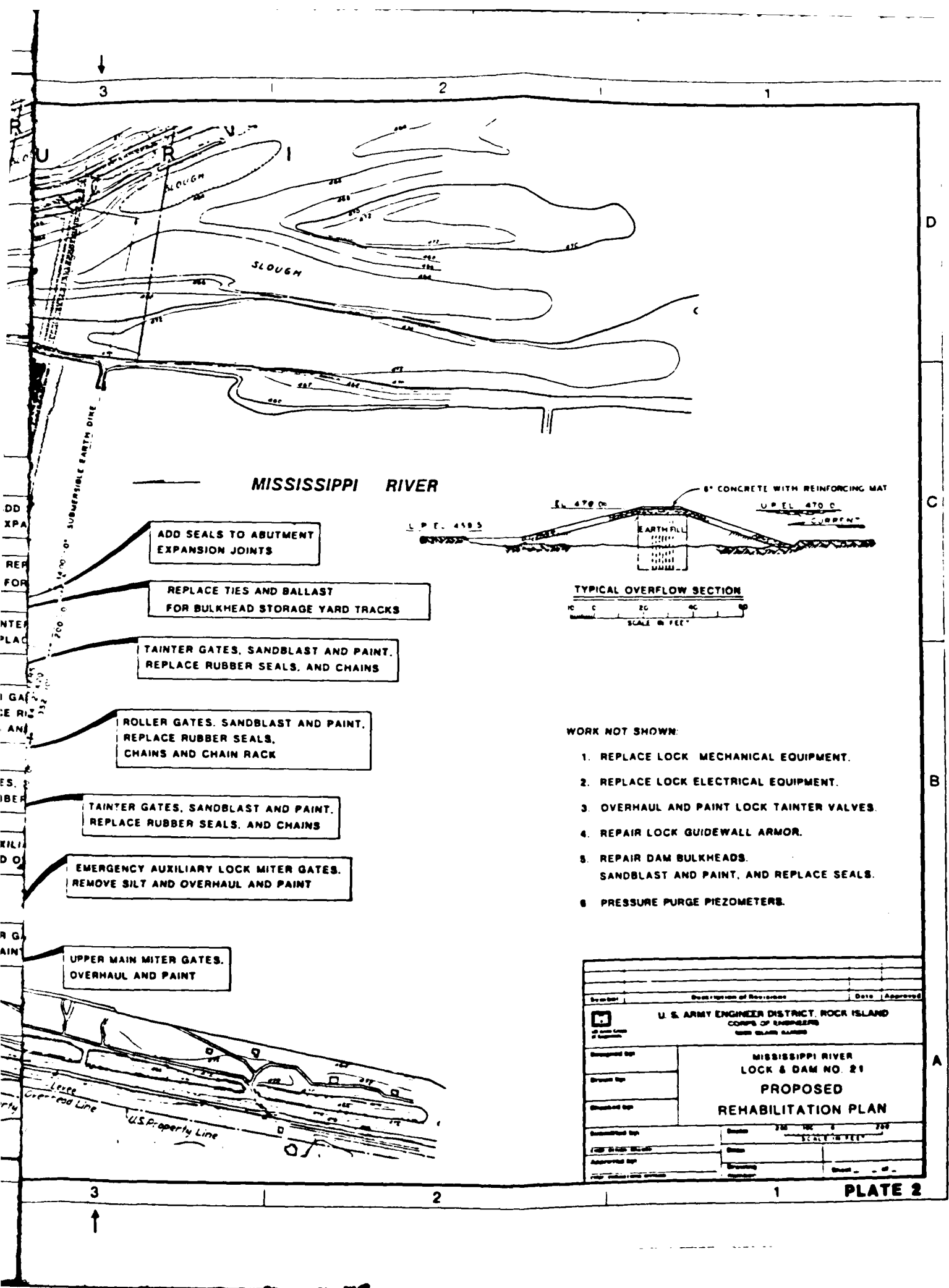
- A. U.S. Fish and Wildlife Service
- B. U.S. Environmental Protection Agency
- C. Illinois Environmental Protection Agency
- D. Illinois Department of Conservation
- E. Missouri State Historic Preservation Officer
- F. Advisory Council on Historic Preservation
- G. Missouri Department of Conservation
- H. Missouri Department of Natural Resources

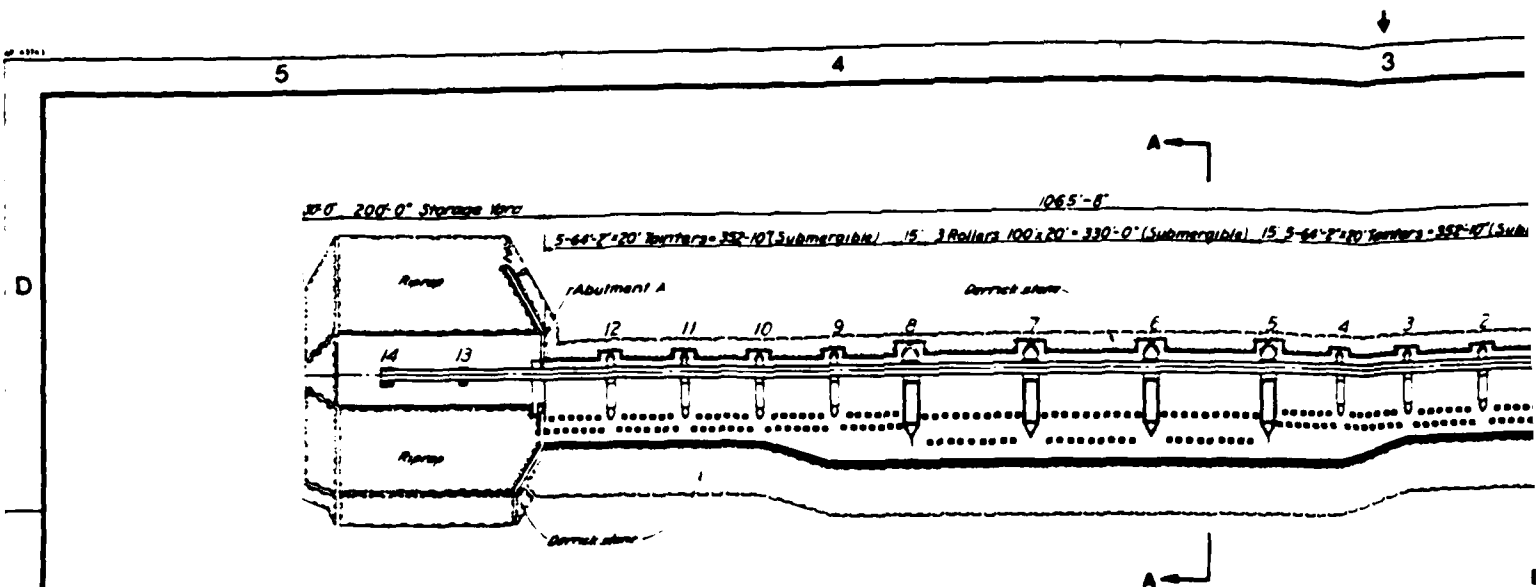


NOTE
Mileage shown is upstream from
the mouth of the Ohio River

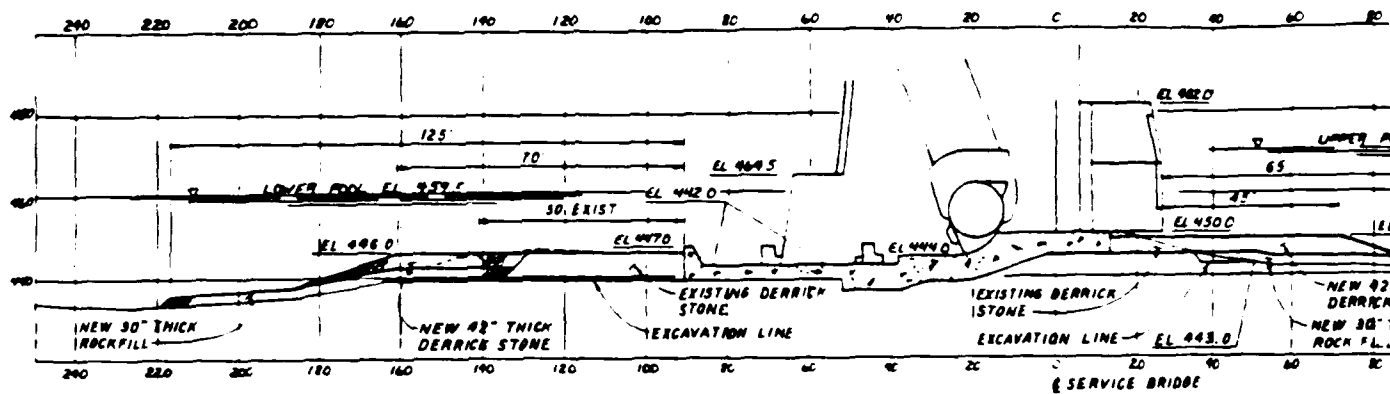
Symbol		Description of Symbol	Date	Approved
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Designed by		MISSISSIPPI RIVER LOCK & DAM NO. 21		
Drawn by		PROJECT LOCATION		
Checked by				
Submitted by		Scale: 1" = 2000' 2500' 3000' 3500' 4000' 4500' 5000' 5500' 6000' 6500' 7000' 7500' 8000' 8500' 9000' 9500' 10000'		
Approved by:		Date: _____ Drawing Number: _____ Sheet: _____ of _____		



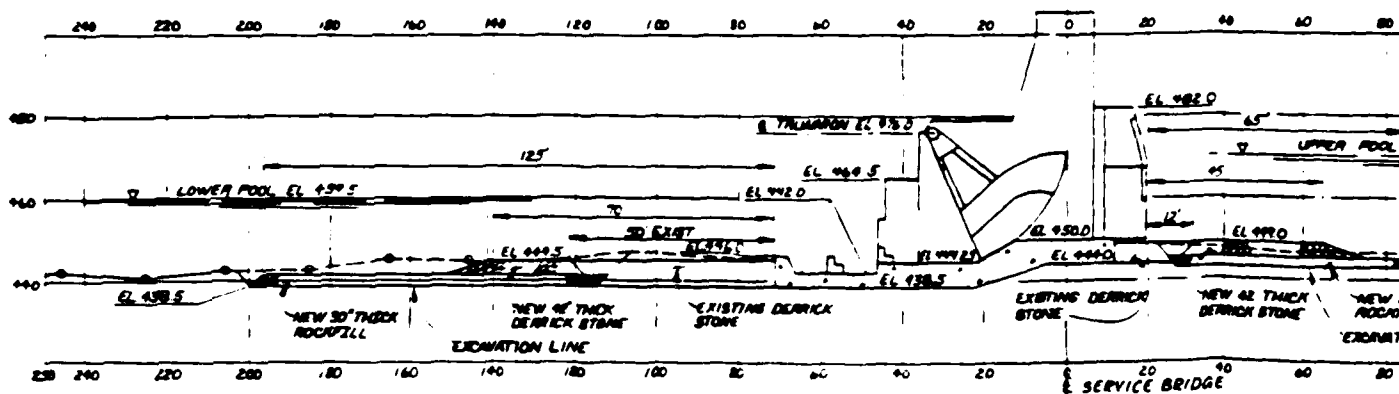




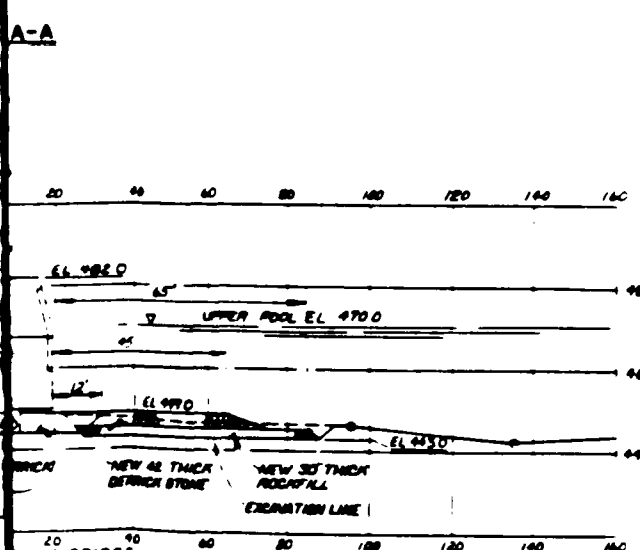
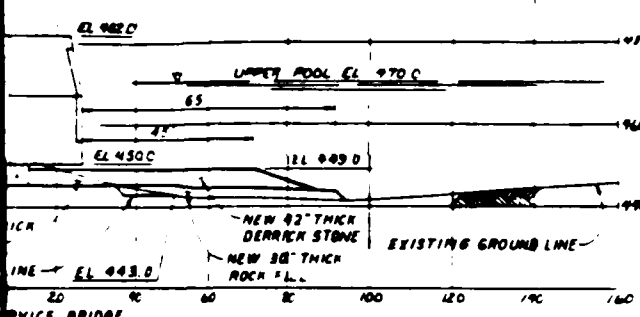
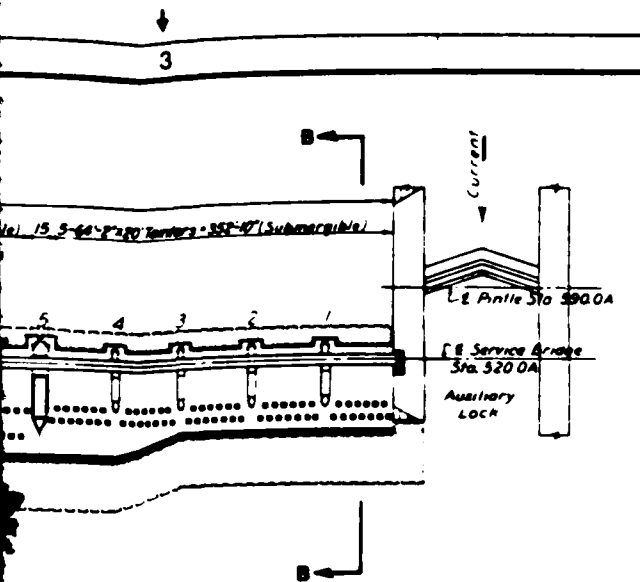
PLAN



SECTION A-A

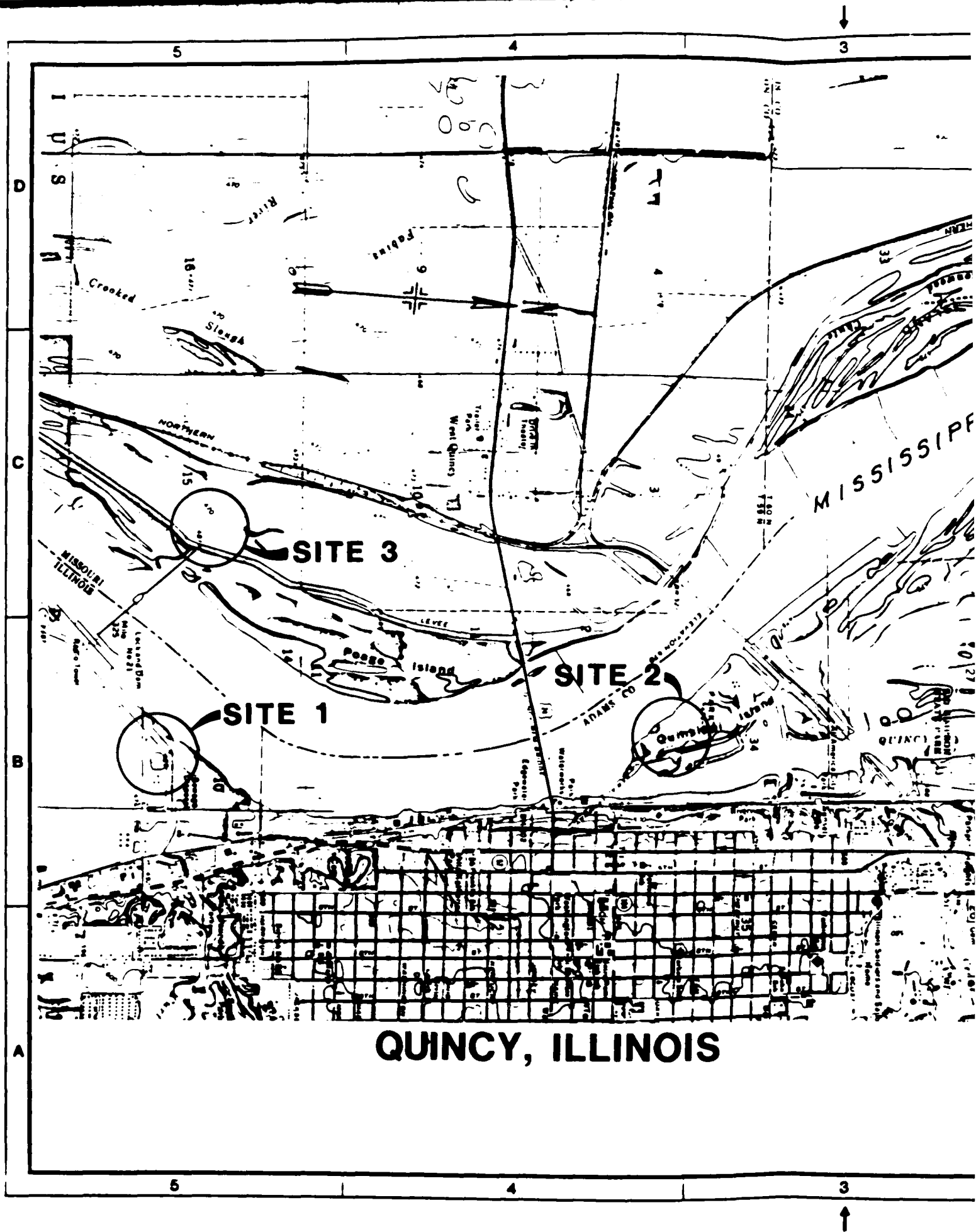


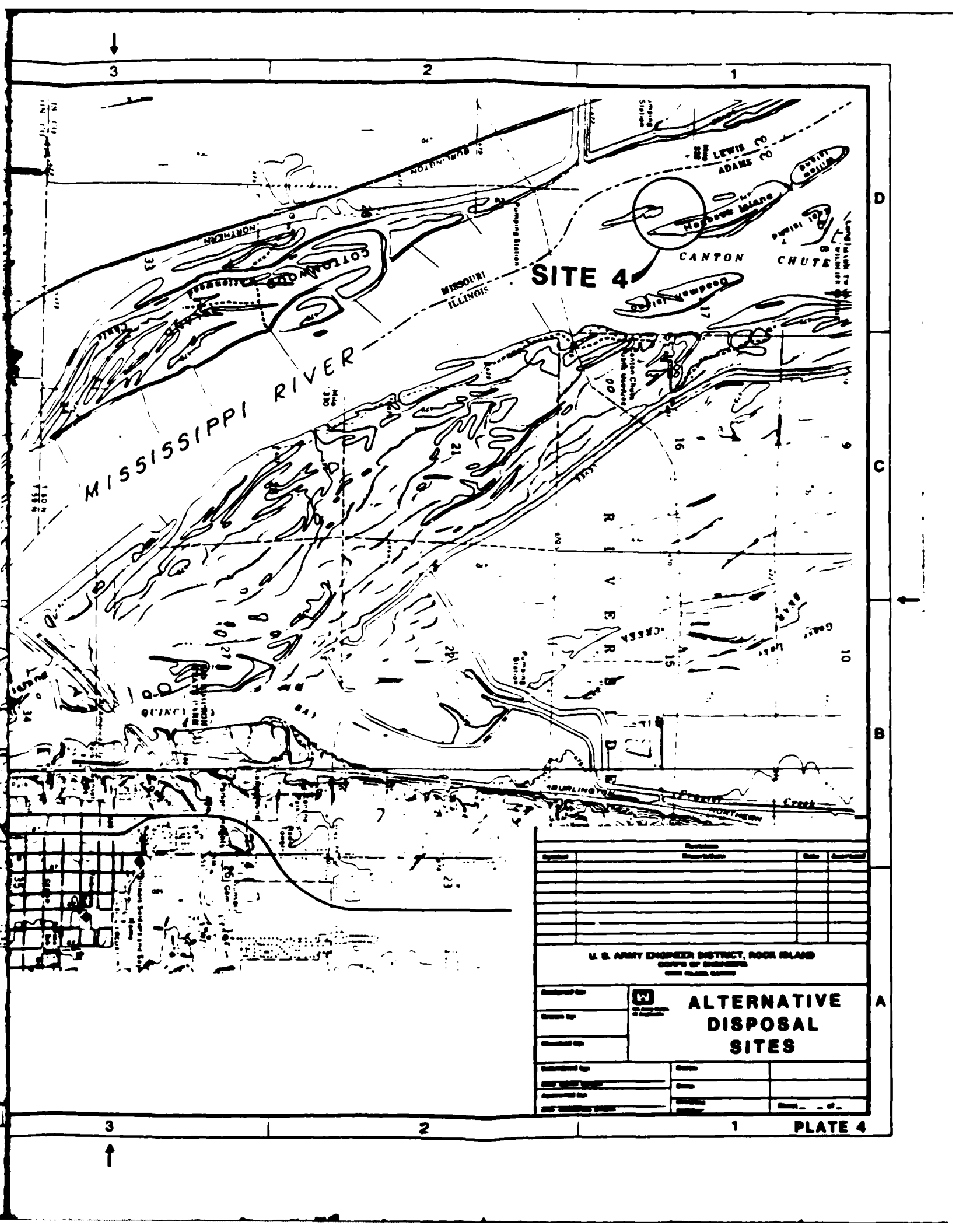
SECTION B-B



Revisions			
Symbol	Description	Date	Approved

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
Designed by Drawn by Checked by Reviewed by Approved by	<div style="text-align: center;"> MISSISSIPPI RIVER LOCK & DAM NO. 21 DAM </div> <div style="text-align: center;"> SCOUR PROTECTION </div>
Station Date Drawing Code	Sheet reference number Sheet ____ of ____





U. S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS MISSISSIPPI RIVER			
Designed by		ALTERNATIVE DISPOSAL SITES	
Drawn by			
Checked by			
Reviewed by			
Approved by			
Special Agent			

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the information provided by this Environmental Assessment, along with data obtained from Federal and State agencies having jurisdiction by law or special expertise, and from the interested public. I find that major rehabilitation of Lock and Dam 21 at Quincy, Illinois, will not significantly affect the quality of the human environment. Therefore, it is my determination that an Environmental Impact Statement is not required. This determination will be reevaluated if warranted by later developments.

Alternatives considered include: (a) No Federal Action; (b) Rehabilitation of the Facility to Original Design Specifications or Criteria; and (c) Rehabilitation of the Facility to Updated Specifications and Criteria.

Factors considered in making a determination that an Environmental Impact Statement was not required were as follows:

- a. No long-term adverse impacts to natural or cultural resources are anticipated. No endangered species, either State or Federal, will be affected by the project action.
- b. No expansion in tow traffic or the navigation capacity of the Nine-Foot Channel will result from the proposed activity.
- c. Land use after the project should remain unaltered, and no economic impacts to the project area are anticipated.

Date

Neil A. Smart
Colonel, Corps of Engineers
District Engineer

PERTINENT CORRESPONDENCE



MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2801 North Ten Mile Drive
Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

March 11, 1985

Colonel William C. Burns, Jr.
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Burns:

We reviewed a copy of Mr. Thomas M. Groutage's February 28, 1985 and March 1, 1985 letters to you concerning rehabilitation work planned for locks and dams on the Mississippi River in Missouri. We are particularly concerned that we became aware of this work only after receiving a copy of the U.S. Fish and Wildlife Service's comments on this matter. As the state agency charged with management and control of fish, wildlife and forest resources, and an active cooperater with your agency on numerous areas of mutual interest, we were quite surprised that we were not informed of your planning activities.

We are concerned that this activity will result in increased navigation capacity, without Congressional authority. Such expansions, as discussed in the Upper Mississippi River Master Plan, would have long term adverse impacts on the river ecosystem.

Members of my staff are in the process of evaluating the U.S. Fish and Wildlife Service planning aid letter on work proposed for Lock and Dam 22. We will offer comments on that letter in the next few weeks. In the interim, we request that you send us copies of plans for work on Lock and Dam 22, 21 and 20.

Sincerely,

Larry R. Gale
LARRY R. GALE
DIRECTOR

cc: Mr. Thomas Groutage
U.S. Fish and Wildlife Service

Mr. Michael Witte
Illinois Department of Conservation

COMMISSION

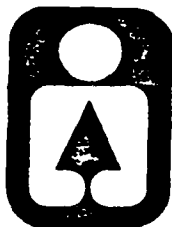
JEFF CHURAN

CARL DISALVO

JOHN B. MAHAFFEY

RICHARD T. REED

Illinois



Department of Conservation

life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787
CHICAGO OFFICE - ROOM 100, 180 NORTH LA SALLE 60601-3184

April 30, 1985

Mr. Thomas M. Groutage
Field Supervisor
USDI, FWS
Rock Island Field Office(ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

RE: Miss. River
L&D 21 & 22
Major Rehab Plan

Dear Mr. ^{TOM}Groutage:

The Department has reviewed your planning aid letters for the above projects. As I relayed to you in our phone conversation on April 26, 1985, the Department has no additional comments on either of these projects at this time.

We support your recommendations for further planning of these projects. Thank you for the opportunity to comment.

Sincerely,

Richard W. Lutz

Richard W. Lutz, Supervisor
Impact Analysis Section

RWL:bp

MAY 2 1985

ARL E. YATES, *Vice Chairman*
1436 South Glenstone
Springfield 65804

F. SCHIERHOLZ, *Member*
P. O. Box 31000
Des Peres 63131

ELEN T. SCHNARE, *Member*
1701 Park Ave.
St. Charles 63301

AUL L. EBAUGH, *Member*
P. O. Box 886
Cape Girardeau 63701

R. "DICK" JOHNSTON, *Member*
P. O. Box 658
Jefferson City 65102



BRUCE A. KING, *Chief Counsel*

L. V. McLAUGHLIN, *Asst. Chief Engineer*

MARI ANN WINTERS, *Secretary*

P. O. Box 270
Jefferson City, Missouri 65102
Telephone (314) 751-2551

May 10, 1985

TRANSPORTATION

Waterways
Lock and Dam Rehabilitation
Comments

Colonel William C. Burns, Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204

Dear Colonel Burns:

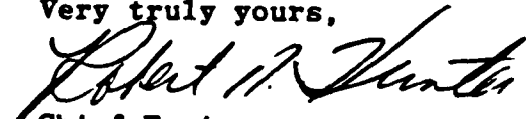
The Missouri Highway and Transportation Department is pleased to hear that your District is presently evaluating necessary lock and dam rehabilitation work on the Mississippi River. This work can provide for the restoration of navigation capacity at the subject lock and dam structures.

Your District serves a significant role in the transportation of commodities on the Mississippi River. Through your District the waterway transportation industry provides benefits to shippers located in the Upper Mid-West. The reach of the Mississippi within your jurisdiction serves as a funnel through which these movements must pass. Further deterioration of these waterway structures serves only to reduce navigation capacity. Rehabilitation would increase traffic movements above present levels; however, we believe this does not represent an increase of navigation capacity as it applies to Public Law 95-502. Capacity which was lost as a result of structure deterioration needs to be restored.

The rehabilitation proposed by your District would also improve operational safety and efficiency in the vicinity of the structures. We suggest that it is highly questionable to continue to delay these needed safety and efficiency improvements.

We commend your District on the straight forward approach being used to address necessary rehabilitation work on the Mississippi River. The time has come to address the needs of waterway transportation and work toward providing adequate capacity to benefit shippers and industries within our region. Efficient transportation service is a necessary element in our nation's economic revitalization. Our Department looks forward to working with you and your staff in carrying out the necessary rehabilitation to restore navigation capacity on the Mississippi River.

Very truly yours,



Chief Engineer



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P O BOX 2004
LOCK ISLAND ILLINOIS 61204 2004

January 14, 1986

REPLY TO
ATTENTION OF

Planning Division

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
1830 Second Avenue, 2nd Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

This letter is in reference to proposed Major Rehabilitation Program work at Lock and Dam 21, Quincy, Illinois, and Lock and Dam 22, Saverton, Missouri.

To facilitate compliance with the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers, Rock Island District, requests information regarding federally listed threatened or endangered species found between approximate river miles 297 and 349, pools 23 to 21. Particular attention should be given to the immediate vicinity of each subject facility.

Information should include:

- a. Potential or known occurrence of federally listed threatened or endangered species;
- b. Presence of known critical habitat of federally listed threatened or endangered species;
- c. General evaluation of effects from rehabilitation-related activities such as dredging and disposal, equipment movement, and seasonal timing of construction-type work; or
- d. Recommendations for further study.

-2-

Please direct any questions to Mr. Bob Clevensline
of our Environmental Analysis Branch at 309/788-6361,
Ext. 344, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Paul Scryke

Dudley M. Hanson, P.E.
Acting Chief, Planning Division



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P O BOX 2004
ROCK ISLAND ILLINOIS 61204 2004

January 28, 1986

REPLY TO
ATTENTION OF
Planning Division

RECEIVED
JAN 31 1986
[Signature]

Mr. William G. Farrar
Deputy Historic Preservation Officer
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701

Dear Mr. Farrar:

We are currently formulating plans to rehabilitate the central control station at Lock and Dam 21 near Quincy, Illinois. This structure is part of the Nine-Foot Navigation Project for the Mississippi River. Extensive documentation can be found in the report entitled Mississippi River Locks and Dams 11-22 by Mary and Peter Rathbun (1984). As a result of this historical evaluation study, the central control station was assigned to Department of the Army preservation category IV, properties of little or no importance at this time. We intend to pursue the necessary rehabilitation for this structure as agreed upon at meetings held in October 1984 and June 1985. It was tentatively agreed that the central control station rehabilitation at Locks and Dams 17 and 22 would be held in abeyance or rehabilitated in accordance with the Secretary of the Interior's Standards while work at the remaining stations continued.

We have not received your comments on the Rathbun Associates report or on National Register and preservation issues; hence, we feel that exercising caution for the stations at Locks and Dams 17 and 22 will preserve representative examples for the future. We also have drafted a cultural resources overview for the rehabilitation program which addresses these topics and evaluates impacts. A draft Programmatic Memorandum of Agreement has been prepared as part of this package for locks and dams within our District. This package should be available for review in the near future. Because of tight schedules and funding requirements, we cannot delay this project any longer while all State Historic

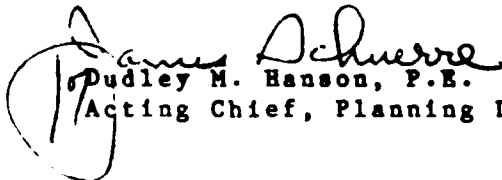
Preservation Officers and the three Corps Districts complete the actions necessary for any system-wide agreements.

Overall, this project should have No Effect on the significance of the system, which is primarily based upon operational characteristics. Original drawings and photographs document the as-built condition. We propose to add new brick facing similar to other brick control stations. Windows and doors will be replaced and a new insulated roof will be installed. Interior improvements include a suspended ceiling and new lighting. A general plan drawing is enclosed for your review along with photocopied photographs.

We request your comments as soon as possible (within 30 days). If you have any questions, please call Mr. Charles Smith at 309/788-6361, Ext. 349. Your comments may be sent to the following address:


District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,


Dudley M. Hanson, P.E.
Acting Chief, Planning Division

Enclosures

CONCUR

By: 
Deputy State Historic Preservation Officer
Date: 2/6/86



Illinois Historic Preservation Agency

Old State Capitol • Springfield • 62701

January 24, 1986

Col. William C. Burns
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Bldg., P.O. Box 2004
Rock Island, IL 61204-2004

Dear Col. Burns:

We have reviewed the draft report entitled Historical-Architectural and Engineering Study, Locks and Dams 11-22, Nine Foot Navigation Project, Mississippi River. This study provides a history of navigation projects on the Upper Mississippi River and a discussion of the significance of those locks and dams within the jurisdiction of the Rock Island District Corps of Engineers. It also proposes one complex as a good, representative example for nomination to the National Register of Historic Places and subsequent preservation.

Current preservation methodology requires the resource protection planning process to consist of several steps:

1. Definition of study unit or universe
2. Application of National Register criteria to elements within universe
3. Prioritization of character defining features
4. Formulation of treatment plan with reference to features within the context of the Secretary of the Interior's "Standards".

It will, therefore, be easiest to frame our comments with reference to these planning steps.

It appears that the appropriate study unit would be the entire Upper Mississippi River Nine Foot Navigation Project with an assigned period of significance of 1913-1940. This study, however, confines itself to that portion of the Project contained in a modern political boundary--the Rock Island Corps district. In order, therefore, for a complete, defensible application of the National Register criteria to the resources to be made, it would be necessary for the study to include the entire historical boundaries of the study unit. We recommend that the entire Project including the resources within the other Corps districts be studied prior to a formal National Register nomination.

The proposal to nominate one complex to the National Register for the purpose of applying the Standards only to that complex combines the identification and treatment plan steps in the preservation planning process. The identification of historic resources does not presuppose "embalming" them as a group or individually. It merely provides a logical framework for understanding the resources as an educational tool.

Once this is accomplished, character defining features of the project can be identified and the various complexes assessed for their individual degree of integrity utilizing these features. A treatment plan, in the form of a Process Memorandum of Agreement, can then be formulated, taking into account, also, current and projected navigation needs. It is quite possible that, at that time, the Illinois State Historic Preservation Office would agree to a rigorous application of the Secretary of the Interior's Standards for Rehabilitation at one complex and make realistic, liberal concessions to navigation needs at other complexes.

In the meantime, we understand that the Corps has immediate plans for a rehabilitation/expansion program at Lock and Dam Complexes 11-22. The Rock Island Corps has acted responsibly in fulfilling its responsibilities under Sections 106 and 110 of the National Historic Preservation Act of 1966. The failure of the other Corps Districts with Project complexes to act in a similar manner should not penalize the Rock Island District nor impede their program.

From the historical documentation presented in this study, however, we believe it is not premature to assume that the entire Project possesses sufficient regional (and, therefore, national) significance for National Register listing. It also appears that sufficient integrity exists at the complexes with the Rock Island District's jurisdiction for inclusion of these resources in a thematic resources nomination of the entire Project despite varying degrees of integrity from resource to resource.

We would, therefore, be willing to consider complexes 11-22 eligible for the National Register of Historic Places and enter into a Memorandum of Agreement for their rehabilitation. (This Memorandum of Agreement could later be amended to include a treatment plan for the remainder of Project complexes.) If this is amenable to the other SHPO's involved, we would be willing to meet and discuss the specific language for a draft document for submission to the Advisory Council on Historic Preservation.

If you have any questions, please call Anne M. Haaker at 217/785-4512.

Sincerely,



William G. Farrar
Deputy State Historic
Preservation Officer



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO

Com: 309-793-5800
FTS: 386-5800

January 31, 1986

Colonel William C. Burns, Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

This is in reference to Mr. Hanson's letter of January 17, 1986 requesting endangered species information for the proposed Major Rehabilitations of Locks and Dams 21 and 22. This information was included in our planning aid letters dated March 29, 1985 and March 1, 1985, respectively.

If you have any questions, please contact Gail Carmody of this office.

Sincerely,

Gail A. Carmody
Gail A. Carmody
Acting Field Supervisor



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P O BOX 2004
ROCK ISLAND ILLINOIS 61204 2004

February 12, 1986

Planning Division

Mr. Michael Witte
Director
Department of Conservation
Lincoln Tower Plaza
524 South Second Street
Springfield, Illinois 62701-1787

Dear Mr. Witte:

This letter is in reference to proposed Major Rehabilitation Program work at Lock and Dam 21 between Quincy, Illinois, and Marion County, Missouri.

To facilitate compliance with the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers, Rock Island District, requests information regarding threatened or endangered species listed by the State of Illinois which may occur in the vicinity of the subject facility.

Information should include:

- a. Potential or known occurrence of State-listed threatened or endangered species;
- b. Presence of known critical habitat for State-listed threatened or endangered species;
- c. General evaluation of effects from rehabilitation-related activities such as dredging and disposal, equipment movement, and seasonal timing of construction-type work; or
- d. Recommendation of investigative source(s) should further study be necessary.

-2-

Please direct any questions to Mr. Bob Clevenstine
of our Environmental Analysis Branch at 309/788-6361,
Ext. 344, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Signed By
J.T. SCHNERRE

Dudley M. Hanson, P.E.
Acting Chief, Planning Division



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND ILLINOIS 61204 2004

February 12, 1986

Planning Division

Mr. Larry R. Gale
Director
Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102

Dear Mr. Gale:

This letter is in reference to proposed Major Rehabilitation Program work at Lock and Dam 21 between Quincy, Illinois, and Marion County, Missouri.

To facilitate compliance with the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers, Rock Island District, requests information regarding threatened or endangered species listed by the State of Missouri which may occur in the vicinity of the subject facility.

Information should include:

- a. Potential or known occurrence of State-listed threatened or endangered species;
- b. Presence of known critical habitat for State-listed threatened or endangered species;
- c. General evaluation of effects from rehabilitation-related activities such as dredging and disposal, equipment movement, and seasonal timing of construction-type work; or
- d. Recommendation of investigative source(s) should further study be necessary.

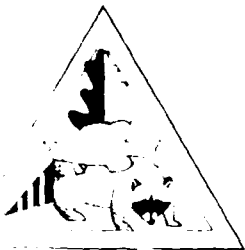
Please direct any questions to Mr. Bob Clevenstine
of our Environmental Analysis Branch at 309/788-6361,
Ext. 344, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Signed By
J. T. SCHNEERRE

Dudley M. Hanson, P.E.
Acting Chief, Planning Division



MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

March 17, 1986

Colonel William C. Burns, Jr.
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204-2004

Attn: Planning Division

Re: Major Rehabilitation Program
Lock and Dam 21

Dear Colonel Burns:

This will respond to a February 12, 1986 letter from Mr. Dudley M. Hanson, Acting Chief of Planning Division.

Two federal species which may be found in the project area are the Higgins-eye pearly mussel (Lampsilis higginsii) and the bald eagle (Haliaeetus leucocephalus). The western sand darter (Ammocrypta clara), a state watch list species, may also be found in the lock and dam vicinity.

We are not aware of designated critical habitat occurring in the project area; however, we have concerns for overall potential impacts of the proposed work on aquatic resources. To assure decisions are based on knowledge, we suggest intensive field studies be conducted in the project area to determine the presence or absence of sensitive species. The enclosed list includes species which have been known to occur in Marion County, Missouri.

We also remain concerned about the expansion of navigation which may result from the proposed work on Mississippi River locks and dams. If you or your staff have questions, please contact William H. Dieffenbach of my staff.

Sincerely,

Larry R. Gale
LARRY R. GALE
DIRECTOR

Enclosure

cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

COMMISSION

DEE CHURAN
Chillicothe

JOHN POWELL
Rolla

JOHN B. MAHAFFEY
Springfield

RICHARD T. REED
East Prairie

Illinois



Department of Conservation

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CHICAGO OFFICE - ROOM 100, 180 NORTH LASALLE 60601-3184

March 17, 1986

Colonel William C. Burns, Jr.
District Engineer
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

Relative to your February 12, 1986 request concerning State of Illinois threatened and/or endangered species in the vicinity of Lock and Dam No. 21, Mississippi River, we refer you to the USFWS planning aid letter of March 29, 1985.

The discussions concerning Illinois T&E species are accurate in our estimation and we have no additional information to add at this time.

Sincerely,

Richard W. Lutz, Supervisor
Impact Analysis Section
Division of Planning

RWL:bp



Illinois Historic Preservation Agency

Old State Capitol • Springfield • 62701

May 20, 1986

District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building -- P.O. Box 2004
Rock Island, IL 61204-2004

Attn: Mr. Dudley M. Hanson, Chief
Planning Division

Dear Mr. Hanson:

We have reviewed the Overview and Cultural Resources Compliance Report for the Major Rehabilitation Program for Mississippi River Locks and Dams 11 through 22.

In our opinion, this document adequately fulfills the requirements necessary for a Preliminary Case Report for purposes of 36 CFR part 800, "Protection of Historic and Cultural Properties."

We have also reviewed the Draft Process Memorandum of Agreement for the program. We suggest amending stipulation "g" to read "...specifications for actions under items b,c and e above." This will allow SHPO review of "no adverse effect" plans to insure adherence to the Secretary of the Interior's "Standards for Rehabilitation". Other than that, the PMOA is acceptable and we would agree to sign it.

If you have questions, please contact Anne M. Haaker at 217/785-4512.

Sincerely,

A handwritten signature in cursive script that reads "William G. Farrar".

William G. Farrar
Deputy State Historic
Preservation Officer

WGF:AMH:ps

JOHN ASHCROFT
Governor



DERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS, RECREATION, AND HISTORIC PRESERVATION

P.O. Box 176
Jefferson City, MO 65102
314-751-2479

June 18, 1986

Dudley M. Hanson
Chief, Planning Division
Department of the Army
Rock Island Corps of Engineers
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Proposed PMOA, Major Rehabilitation Program, Mississippi River Locks
and Dams 11-22, Rock Island District

Dear Mr. Hanson:

In response to your letter dated 11 April 1986 concerning a draft Process Memorandum of Agreement (PMOA) for the major rehabilitation program proposed for Mississippi River Locks and Dams 11-22, properties potentially eligible for inclusion in the National Register of Historic Places, the Missouri Historic Preservation Program has the following comments:

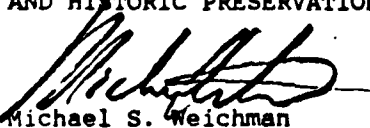
1. A stipulation should be included which states that Rock Island District Corps of Engineers (NCR) will initiate, in conjunction with the St. Paul and St. Louis Corps Districts, a formal nomination of the Mississippi River Locks and Dams System to the National Register of Historic Places.
2. Stipulation h and i - coordination and consultation with the State Historic Preservation Officer (SHPO) should not be limited to Illinois. It is suggested that Missouri, Iowa and Wisconsin SHPOs also be included.

In general, we find the draft PMOA to be acceptable and we would be willing to be a signator of such an agreement.

If I can be of further assistance, please call 314/751-7958 or write.

Sincerely,

DIVISION OF PARKS, RECREATION,
AND HISTORIC PRESERVATION


Michael S. Weichman
Chief, Review and Compliance

MSW:ro

**IOWA STATE HISTORICAL DEPARTMENT
OFFICE OF HISTORIC PRESERVATION**

ADRIAN D. ANDERSON, Executive Director
STATE HISTORIC PRESERVATION OFFICER

June 24, 1986

Dudley M. Hanson, P.E.
Chief, Planning Division
U.S. Army Engineer District, Rock Island
Clock Tower Building-P.O. Box 2004
Rock Island, Illinois 61204-2004

RE: MAJOR REHABILITATION PROGRAM, MISSISSIPPI RIVER LOCKS AND
DAMS 11 THROUGH 22 IN THE ROCK ISLAND DISTRICT: OVERVIEW
AND CULTURAL RESOURCES COMPLIANCE REPORT WITH A PROCESS
MEMORANDUM OF AGREEMENT

Dear Mr. Hanson:

We have completed our review of the above referenced report that you submitted to this office in late April. This document more than adequately meets the requirement for case reports and is a thorough and adequate summary of actions to date concerning Locks and Dams 11 through 22. We concur with your assessment that the majority of proposed rehabilitation activities will not adversely impact significant lock and dam characteristics, and that overall the project may prove beneficial. We also concur that the proposed Process Memorandum of Agreement (PMOA) provides for adequate protection of significant features of the system pursuant to Sections 106 and 110 of the National Historic Preservation Act and related regulations and guidelines. We do suggest two changes in that document, however. Stipulation b., which concerns activities impacting significant structures or features, should be revised to include SHPO participation and review. Stipulation g. should then be revised to reflect this as well.

If you have questions or concerns, please do not hesitate to contact me or Ralph Christian, our architectural historian, at 515/281-8697.

Sincerely,



David Crosson
State Historic Preservation Officer

-2-

cc: Michael Quinn, Advisory Council on Historic Preservation
Anne Haacker, Illinois SHPO
Michael Lipsman, Missouri SHPO
Chip Smith, Rock Island District, Army Corps of Engineers



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

ROCK ISLAND FIELD OFFICE (ES)

1830 Second Avenue, Second Floor

Rock Island, Illinois 61201

Com: 309-793-5800

FTS: 386-5800

September 30, 1986

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

This is our final Fish and Wildlife Coordination Act Report for the Lock and Dam 21 proposed major rehabilitation plan, Mississippi River at Adams County, Illinois and Marion County, Missouri. It has been prepared under the authority of and in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and in accordance with the Fish and Wildlife Service's Mitigation Policy.

By copy of this letter, we are requesting comments from the Illinois and Missouri Departments of Conservation. Comments from both states on our planning aid letter are attached. Our letter is based on aerial photography, information contained in the "Resources Inventory for the Upper Mississippi River" (Peterson 1984), and information provided by your staff.

Description of the Project

The rehabilitation is proposed for the Lock and Dam 21 structure, Mississippi River Mile 324.9. The work includes repair and maintenance of the overflow dike, the tainter and roller gates, lock walls and miter gates, and the auxiliary lock miter gate and chamber; improvement and maintenance of lock and dam machinery; and construction of a guardcell downstream of the immediate wall. Included in the work is: (1) extension of the scour protection below the gated portion of the dam, (2) dredging 27,000 cubic yards of silt from the auxiliary lock to provide maintenance access, (3) removing 3,000 cubic yards of rock and debris from the main lock chamber, and (4) placing a 6-inch layer of concrete with reinforcing mat on the overflow section of the dam. Extension of the upstream and downstream guidewalls have been deleted from the proposed work.

Description of Fish and Wildlife Resources in the Project Area

Aquatic habitats above and below the dam are extremely valuable. Above the dam is Monkey Chute which is a valuable sport fishery for largemouth bass, bluegill, and crappie. This chute is also commercially fished and is

important spawning habitat. The tailwaters, below the dam, have an important sport fishery for channel catfish, flathead catfish, walleye, sauger and white bass. The majority of sportfishing is by boat; however, a significant number of fishermen fish from the overflow section of the dam. The main channel border below the dam is an important commercial fishing site. Recreational boating access is provided by a boat ramp just downstream of the lock.

No significant mussel beds are found in the immediate vicinity of the dam. Ecological Analysts (1981) collected seven species of mussels below the dam (Table 1). No other benthos sampling has been done in the project area.

Table 1. Freshwater mussels collected below Lock and Dam 21, right main channel border, Mississippi River near Quincy, Illinois (Ecological Analysts 1981).

Species	River Mile		
	324.9R-324.8R	324.5R	324.5-324.2R
Three-ridge (<u>Amblema plicata plicata</u>)		1	
Stout floater (<u>Anodonta grandis grandis</u>)			1
Wabash pig toe (<u>Fusconaia flava</u>)		6	1
Fragile papershell (<u>Leptodea fragilis</u>)			1
Three-horned warty back (<u>Obliquaria reflexa</u>)		1	
Hickory nut (<u>Obovaria olivaria</u>)	1	1	1
Pimpleback (<u>Quadrula pustulosa</u>)	1		
Total Number of Species	2	4	4
Total Number of Individuals	2	9	4

Terrestrial habitat in the project area is limited to the backwater complexes above and below the dam. These areas are important bottomland hardwood habitat and are important to waterfowl, furbearers, deer. Evidence of river otters have been observed in the Monkey Chute area. Both areas are open to public hunting. Endangered bald eagles use the mature trees for day perches and feed in the tailwaters.

Endangered Species

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal Agencies are required to obtain information from the Fish and Wildlife Service concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

<u>Classification</u>	<u>Common Name</u>	<u>Scientific Name</u>	<u>Habitat</u>
Endangered	Indiana Bat	<u>Myotis sodalis</u>	Caves & Riparian
Endangered	Bald Eagle	<u>Haliaeetus leucocephalus</u>	Breeding Wintering
Endangered	Higgin's Eye Pearly Mussel	<u>Lampsilis higginsii</u>	Rivers
Endangered	Fat Pocketbook Pearly Mussel	<u>Potamilus capax</u>	Rivers

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended, the Federal agency responsible for actions authorized, funded, or carried out in furtherance of a construction project that significantly affects the quality of the human environment, is required to conduct a biological assessment. The purpose of the assessment is to identify listed or proposed species likely to be adversely affected by their action and to assist the Federal agency in making a decision as to whether they should initiate consultation.

Section 7(d) of the 1978 Amendment to the Endangered Species Act underscores the requirement that the Federal Agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which in effect would deny the formulation or implementation of reasonable alternatives regarding their actions on any endangered or threatened species.

The bald eagle feeds in the tailwaters of the dams on the Upper Mississippi River during winter. Large trees adjacent to the tailwaters are used as day perches between roosting areas and feeding flights. No Higgin's eye pearly mussels, fat pocketbook pearly mussels, or Indiana bats have been documented in the immediate project area. However, it is possible that the Indiana bat forages in the project area or that maternity colonies may be present at recently dead trees with loose bark. There is no designated critical habitat in the project area at this time.

State Protected Species

The following species have been identified as threatened or endangered by the States of Missouri and Illinois. Information is based on documentation in each county.

<u>Species</u>	<u>Scientific Name</u>	<u>Missouri</u>	<u>Illinois</u>
Double-crested cormorant	<u>Phalacrocorax auritus</u>	endangered	-
Cooper's hawk	<u>Accipiter cooperii</u>	endangered	-
Henslow's sparrow	<u>Ammodrammus henslowii</u>	-	threatened
Bald eagle	<u>Haliaeetus leucocephalus</u>	rare	-
Gray bat	<u>Myotis grisescens</u>	endangered	endangered
Yellow mudturtle	<u>Kinosternon flavescens</u>	rare	-
Smooth green snake	<u>Opheodrys vernalis</u>	rare	-
Massasauga	<u>Sistrurus catenatus</u>	rare	-
Hickory nut	<u>Obovaria olivaria</u>	rare	-
Warty-back	<u>Quadrula nodulata</u>	rare	-
Lake sturgeon	<u>Acipenser fulvescens</u>	endangered	-
Burbot	<u>Lota lota</u>	rare	-
Narrow-leaved green milkweed	<u>Asclepias stenophylla</u>	-	threatened
---	<u>Aster paludosus</u> subsp. <u>hemisphericus</u>	rare	-
--	<u>Flaveria campestris</u>	endangered	-
Pineweed	<u>Lechea racemulosa</u>	undetermined	-
Red-berried elder	<u>Sambucus pubens</u>	rare	-
Amethyst shooting star	<u>Dodecatheon radicum</u>	rare	-
Sedge	<u>Carex communis</u>	-	endangered
Sedge	<u>Carex parasina</u>	-	endangered
Prairie white-fringed orchid	<u>Habenaria leucophaea</u>	-	endangered
Golden seal	<u>Hydrastis canadensis</u>	-	threatened
Prairie clover	<u>Lespedeza leptostachya</u>	-	endangered
Ginseng	<u>Panax quinquefolius</u>	-	threatened
Arching dewberry	<u>Rubus enslenii</u>	-	endangered
Prairie spiderwort	<u>Tradescantia bracteata</u>	-	endangered
Buffalo clover	<u>Trifolium reflexum</u>	-	endangered
Green trillium	<u>Trillium viride</u>	-	threatened
Rock elm	<u>Ulmus thomasii</u>	-	threatened
False hellebore	<u>Veratrum woodii</u>	-	threatened
Arrowwood	<u>Viburnum molle</u>	-	endangered

In addition, the rare western sand darter (Ammocrypta clara) has been documented 1/4 mile below and 2 miles above Lock and Dam 21.

Impacts to Fish and Wildlife Resources

It is our understanding that the existing concrete overflow dike on the Missouri section will be replaced with a layer of concrete with a reinforcing mat. This work will not impact fish and wildlife resources, but may temporarily disturb sportfishing. No work will be done on the non-overflow section of the dike.

Additional scour protection will be added below the gated portion of the dam. Rock fill will extend 100 feet below the dam, and riprap will be placed 60 feet below the dam. Approximately 17,000 cubic yards of rock fill and 10,500 cubic yard of riprap capstone will be used and placed along existing bathymetric contours. Placement of scour protection will result in a temporary loss of benthos that should recolonize in a short period of time.

The value of this riprap to aquatic resources will depend on the size of rock used. The highest value will come from using rock that is 3 to 4 feet or greater in diameter. In studies of riprap in Pool 24, the Missouri Department of Conservation (Farabee 1984) has found increased relative abundance of fish at sites with riprap at least 3-1/2 feet in diameter. Smaller riprap produces similar species diversity but less numbers of fish.

Approximately 27,000 cubic yards of silt will be removed from the auxiliary lock chamber. Dredging of these sediments may affect aquatic resources if the sediment is polluted. Resuspension or disposal of polluted sediments could affect valuable aquatic resources. Potential disposal site alternatives have been identified on Hogback Island and Quinsippi Island. We previously recommended that the material be removed with a mechanical dredge, barged to the Hogback Island channel maintenance disposal site (RM 331.8L), and used to revegetate the interior of this historic sand disposal site. However, the amount of material currently estimated is much too great for this site. We recently became aware of the Quincy Park District plans for Quinsippi Island Development. Potentially, this plan could use considerable quantities of fill. We have no objection to the use of Quinsippi Island as a disposal site provided all material is placed in a non-wetland, previously disturbed site. This is also an acceptable disposal site for the 3,000 cubic yards of rock and debris from the main lock chamber. Placement of 90 cubic yards of balast in the storage yard will have no impact to fish and wildlife resources.

An unknown quantity of fill will be required to construct the lower guardcell. This will result in a permanent loss of main channel border habitat. Due to the location of this fill, it is expected that impacts will be minimal. Finally, there may be some reduction of water quality from the paint residue sandblasted from the dam gates.

As discussed in our letters of February 28, 1985 and October 22, 1985, we are concerned about the possible cumulative impacts of these rehabilitation projects on increasing navigation traffic on the Upper Mississippi River. Due to lack of information from your staff, we are unable to estimate the potential impact to fish and wildlife from this possible increase in capacity.

Mitigation

In accordance with the Service Mitigation Policy (46 FR 7644-7655), we have evaluated the habitats to be impacted by the proposed project to determine their Resource Categories and proper Mitigation Goals. The Resource Categories and their Mitigation Goals are as follows:

Resource Category 1 - habitat is of high value and is unique and irreplaceable in the nation or ecoregion. Goal - no loss of existing habitat value. Guideline - the Service will recommend that all losses of existing habitat be prevented as these one-of-kind areas cannot be replaced. Insignificant changes are acceptable provided they will have no cumulative impact.

Resource Category 2 - habitat is of high value and is relatively scarce or becoming scarce in the nation or ecoregion. Goal - no net loss of in-kind habitat value. Guideline - losses that cannot be otherwise

avoided, minimized, rectified or eliminated over time can be compensated by replacement with the same kind of habitat so that the total or net loss is zero.

Resource Category 3 - habitat is of high to medium value and is relatively abundant in the nation. Goal - no net loss of habitat value while minimizing loss of in-kind habitat value. Guideline - losses that cannot be otherwise avoided, minimized, rectified, eliminated over time or compensated by in-kind replacement can be compensated by replacement with other habitat types so that the total or net loss is zero.

Resource Category 4 - habitat is of medium to low quality. Goal - minimize loss of habitat value. Guideline - the Service will make recommendations to avoid, minimize, rectify or eliminate losses over time depending on the significance of the potential loss. Such areas are good candidates for mitigation of Resource Category 2 and 3 losses by management or enhancement to increase their habitat value.

We have assigned Resource Category 2 to all aquatic habitats to be impacted except the lock chamber, Category 2 to all bottomland hardwood habitat, and Resource Category 4 to the overflow dike and the auxiliary lock chamber. Undisturbed bottomland hardwoods and wetland areas of Quinsippi island have been assigned Resource Category 2. All other forested areas are Resource Category 3 and developed parkland, Category 4. The impacts from the proposed project can be adequately mitigated by avoiding all losses of bottomland hardwood or other wetland habitat, using riprap 3 to 4 feet in diameter, avoiding any habitat losses at the selected dredged material disposal site, using plants of high wildlife food value for any revegetation, and minimizing impacts to water quality.

Recommendations

Based on this analysis, we have the following recommendations for further planning for the the proposed project:

1. Evaluate the potential of the guardcell to increase tow locking efficiency.
2. No bottomland hardwoods be cleared.
3. All submerged riprap be 3 to 4 feet in diameter or greater.
4. Resurfacing of the earthen dike be done in such a manner as to not prevent fishermen access.
5. Means be investigated to improve walk-in fishing access.
6. A composite analysis of the sediments in the auxiliary lock chamber be performed to determine organic and metal content.
7. Assuming no significant pollutants in the sediments, dredged material should be barged to Quinsippi Island. Actual selection of disposal sites should be coordinated with the Illinois Department of Conservation and this office. All unavoidable habitat losses due to disposal will require adequate compensation.


8. This project be included in an analysis of the possible increases in tow traffic (see our letter of April 7, 1986). As stated previously, this should be a cumulative assessment and should include all proposed rehabilitation work and the Second Lock proposed for Lock and Dam 26(R).
9. Work in the tailwaters be conducted in late fall or winter to minimize interference with sport fishermen.
10. Means be employed to minimize the impacts to water quality from the paint residue that enters the river during the sandblasting of gates and the dredging of the auxiliary lock chamber.

This project also offers several opportunities for enhancement of fish and wildlife resources that we would like to discuss with you further. Some suggestions are:

1. Improve shoreline habitat with rock in the Missouri tailwaters.
2. Improving shallow water habitat above the dam.

We understand that you intend to initiate the scoping process for a cumulative document this fall, and to develop a schedule for completion of such a document by January 1987. We applaud your effort and offer any assistance we can provide in this regard. However, if we do not feel that substantial progress has been made toward scoping and completion of appropriate NEPA documentation, we may not be able to provide final Fish and Wildlife Coordination Act Reports for any additional lock and dam rehabilitation projects.

Sincerely,


Richard C. Nelson
Field Supervisor

Enclosure

cc: IL DOC (Lutz, Bertrand, Cochran & McClain)
IL EPA (Yurdin)
MO DOC (Dieffenbach, Farabee)
U.S. EPA (Kansas City & Chicago)

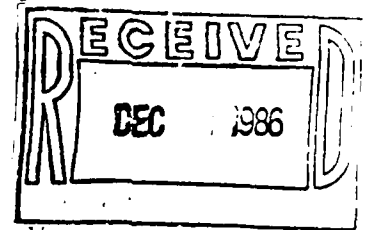
Literature Cited

- Bowles, M.L., V.E. Diersing, J.E. Ebinger, and H.C. Schultz, eds. 1981. Endangered and threatened vertebrate animals and vascular plants of Illinois, Prepared by the Natural Land Institute . Illinois Dept. of Conservation, Springfield, IL. 189 +pp.
- Ecological Analysts, Inc. 1981. Environmental resources inventory: South Quincy, Illinois Drainage and Levee District. Prepared for U.S. Army Corps of Engineers, Rock island District. Ecological Analysts, Inc., Northbrook, IL.
- Farabee, G. 1984. Final report on electrofishing data collected from revetted and natural shoreline - Mississippi River, river miles 288, 289, 291, and 294. Missouri Dept. of Conservation, Palmyra, MO. 5 +pp.
- Nordstrom, G.R., W.L. Pflieger, K.C. Sadler, and W.H. Lewis. 1977. Rare and endangered species of Missouri. Missouri Dept. of Conservation and U.S. Soil Conservation Service, Jefferson City, MO. 129pp.
- Peterson, G.A. ed. 1984. Resources Inventory for the Upper Mississippi River, Guttenberg, Iowa to Saverton, Missouri. Prepared for U.S. Army Corps of Engineers, Rock Island District, Rock Island, Illinois, under Letter Order No. NCR-LO-83-C9. U.S. Fish and Wildlife Service, Rock Island, IL. 136pp.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004



November 25, 1986

Planning Division

Mr. William G. Farrar
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701

IHPA REVIEW
HZA Concur 12/8
AC ✓
AR SO B Dec 26 86
File A 100-15-100

Dear Mr. Farrar:

The Rock Island District is currently considering plans for the disposal of dredged material associated with the rehabilitation of Lock and Dam 21 near Quincy, Adams County, Illinois. The proposed disposal areas are located along the west shore of Quinsippi Island (map attached).

Proposed disposal areas 1 and 2 were repeatedly used for dredged material disposal in the 1960's. A field inspection by District Archeologist, Kenneth Barr, on September 16, 1986, indicated that these two areas are completely buried by up to 15 feet of dredged material. Due to the previous disturbance of the area by current disposal events, it is our opinion that the proposed disposal activities at sites 1 and 2 will have No Effect on significant cultural resources. However, if another area is selected for the disposal site, a cultural resources survey may be necessary.

Please comment on this project within 30 days. If you have any questions on this action, please call Mr. Kenneth Barr at 309/788-6361, Ext. 349, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61201-2004

Sincerely,

D. D. Blodman
for Dudley M. Hanson, P.E.
Chief, Planning Division

CONCU
By: *William G. Farrar*
Deputy State Historic Preservation Officer



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P O BOX 2004
ROCK ISLAND ILLINOIS 61204 2004

December 5, 1986

Planning Division

Mr. Richard Nelson
Field Supervisor
U.S. Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

The District has completed an analysis to determine the impacts to navigation traffic resulting from construction of a lower guard cell at Lock and Dam 21, as discussed during our meeting on November 25, 1986. Enclosed for your review and comment is an appendix describing the analysis, which concludes that the lower guard cell at Lock and Dam 21 will have no immediate or long-term impact on the level of traffic transiting the lock, nor will it increase the ability of the lock to accommodate additional traffic.

We also indicated at the November 25, 1986, meeting that an analysis concerning the proposed guardwall at Lock and Dam 22 would be forthcoming for your review. Since that meeting, the District has determined that the guardwall could not be constructed at Lock and Dam 22 unless there was also an upper guidewall extension. Therefore, we are removing the guardwall from the site-specific Environmental Assessment, and will include this feature in the NEPA Document being prepared to assess the potential for increases in navigation traffic and cumulative impacts.

We would appreciate your comments on the analysis and our conclusions as soon as possible. Please call Mr. Ken Younker of our Economic and Social Analysis Branch at 309/788-6361, Ext. 394, or Ms. Karen Bahue of our Environmental Analysis Branch at Ext. 384, should you have any questions on our analysis.

-2-

Please send your comments to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

ORIGINAL SIGNED BY

Dudley M. Hanson, P.E.
Chief, Planning Division

Enclosure

EVALUATION OF IMPACTS TO NAVIGATION RESULTING FROM
CONSTRUCTION OF LOWER GUARD CELL AT LOCK AND DAM 21

General

The proposed rehabilitation of Lock and Dam 21 includes construction of a sheet pile guard cell to be located approximately 100-125 feet downstream of the lower intermediate lock wall (the wall separating the main and emergency chambers). Construction of the cell is proposed primarily as a safety feature to assure that upbound tows are better aligned for chamber entry. The presence of the guard cell will force the head of the tow within the cell thereby enhancing a proper final approach. Benefits to be derived through construction of this cell result from reduced damage to the miter gates and adjacent areas caused by improperly aligned tows striking the gates.

Although proposed as a safety feature, questions have been raised as to the potential for this feature to reduce upbound average approach times at the lock and subsequently enhance the ability of the lock to accommodate traffic and/or increase the level of traffic desiring to use the lock. This analysis evaluates the potential of such gains in traffic or lock efficiency.

In a 1981 report, Louis Berger & Associates (LBA) ^{1/} indicated that various improvements to approaches at selected locks and dams on the Upper Mississippi River could possibly provide increased operating efficiency at these locks. Among these improvements were extension of the landside guidewalls and installation of guard cells angled towards the center of the river from the upstream end of the river wall. The LBA report concluded that extension of the guidewalls at Lock and Dam 21 could possibly result in reduced approach times of 2-4 minutes. The report failed to identify or quantify any potential increases in operating efficiency accruing from construction of the guard cells angled upstream of the river guard wall.

The LBA report also failed to identify or quantify any potential efficiency increases resulting from construction of an individual guard cell, such as that proposed at Lock and Dam 21. Since both its design and location are dissimilar from other proposals included in the Berger report, any gains in efficiency such as those possibly accruing from extended guidewalls, cannot be inferred to accrue through construction of the guard cell at Lock and Dam 21.

^{1/} Inventory of Potential Structural and Non-Structural Alternatives for Increasing Navigation Capacity-Upper Mississippi River Master Plan, Louis Berger & Associates, 1981.

Methodology

The methodology used to evaluate the impacts to navigation resulting from construction of the cell at Lock and Dam 21 consists of comparing lock performance statistics under a "with project" and "without project" condition at an adjacent lock. A similar guard cell was constructed downstream of the lower intermediate lock wall in September, 1983 at Lock and Dam 22, located 24 miles downstream of the project site. It is believed that a guard cell at Lock and Dam 21 will provide similar benefits to the cell located at Lock and Dam 22. However, because the outdraft problem in the lower pool at Lock and Dam 22 is considered more hazardous than that of Lock and Dam 21, this comparison should provide a measure of the upper limit of benefits that may be accrued at Lock and Dam 21.

Performance monitoring system (PMS) data for years 1982 and 1984 were used to compare performance statistics for upbound tows approaching Lock 22 under conditions with the guard cell (1984) and without the guard cell (1982). PMS data permits analysis of various components of the lockage process including approach time. In addition, PMS data provides statistics regarding three different types of approaches: fly, exchange, and turnback. A fly approach occurs when the lock has been idle and the inbound vessel directly enters the chamber. An exchange approach occurs when the vessel inbound to the chamber passes a vessel outbound from the chamber. A turnback approach occurs when the preceding event is a lockage where no tows were served. For this analysis, only fly approach times were utilized. Times of exchange approaches were not considered because these times are a function of the point where the two oncoming tows pass and may vary with each approach. Similarly, turnback approach times were not utilized, as awaiting tows are usually moored at a point on the lower guidewall where the guard cell is of little assistance in chamber entry. Utilization of upbound approach times resulted in a sample size of at least 10 percent of the 5,409 and 5,718 commercial lockages that occurred in 1982 and 1984, respectively.

Further analysis was conducted regarding the potential increase in safety accruing from construction of the guard cell. This analysis consisted of comparing accident records pertaining to upbound approaching tows for 1982 and 1984 at Lock and Dam 22 under conditions with and without the cell in place.

Findings

Comparison of upbound approach times between 1982 (without guard cell) and 1984 (with guard cell in place) yielded no difference in average approach times. For both years, average upbound fly approach times were identical--28 minutes. During 1982, prior to construction of the cell at Lock and Dam 22, there were 6 accidents at the lock involving upbound approaching tows. During 1984, following construction of the cell, only one such accident occurred.

Conclusions

FMS data does not indicate a difference in average approach times of upbound tows at Lock and Dam 22 prior to construction of the guard cell or afterward. As a result, it can be concluded that construction of a guard cell at Lock and Dam 21 will have no immediate or longterm impact on the level of traffic transiting the lock, nor will it increase the ability of the lock to accommodate additional traffic. With construction of the guard cell, however, an extra margin of safety will be provided at the lock. Increased safety translates to reduced government and private property damage, as well as reduced exposure to possible barge spills which may have negative environmental impacts.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY

ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

COM: 309-793-5
FTS: 386-5800

January 22, 1987

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Attn: Planning Division

Dear Colonel Smart:

This is to supplement our final Fish and Wildlife Coordination Act Report for the Lock and Dam 21 Major Rehabilitation Program. Since completion of our final report, dated September 30, 1986, the District has provided us additional information concerning the proposed project.

The District completed an analysis of the potential impact on tow approach times that may result from construction of a downstream guard cell. The analysis compared approach times before and after construction of a similar guard cell at Lock and Dam 22. This comparison found no difference in average approach times. It did, however, find a reduction in the number of accidents following guard cell construction. Based on this analysis, we concur that the lower guard cell proposed for Lock and Dam 21 will have no affect on increasing navigation traffic.

Secondly, a number of alternatives for disposal of dredged material have been evaluated. We understand that the District's preferred alternative is the Blickhorn Co., Inc. landfill on Lock and Dam Road. We concur with the use of the landfill as a disposal site. However, we would like to review the dredging and disposal method for this site when it is selected. Although the sites on Quinsippi Island (see memorandum for record dated November 10, 1986) are now non-preferred alternatives, we would concur with their use if need be.

For your information, letters of comment received from the Illinois and Missouri Departments of Conservation are enclosed. Please note that Illinois has requested that work in the tailwaters be completed prior to December 15 to minimize impacts to feeding eagles.

If you have any questions, contact Gail Carmody or myself. We are pleased we have been able to resolve the outstanding issues regarding this project.

Sincerely,

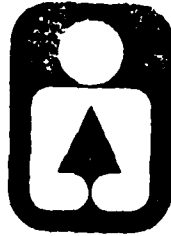
A handwritten signature in dark ink, appearing to read "Richard C. Nelson". The signature is fluid and cursive, with the first name "Richard" being more prominent than the last name "Nelson".

Richard C. Nelson
Field Supervisor

Enclosures

cc: ILDOC (Lutz)
 MODOC (Dieffenbach)
 USEPA (Kring)

Illinois



Department of Conservation

life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787
CHICAGO OFFICE • ROOM 4-300 • 100 WEST RANDOLPH 60601
Michael B. Witte, Director • James C. Helfrich, Assistant Director

November 6, 1986

Mr. Richard C. Nelson
Field Supervisor
U.S.D.I.-FWS
Rock Island Field Office(ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

The Department has reviewed the final Fish and Wildlife Coordination Act Report for Lock and Dam 21 proposed major rehabilitation plan, Mississippi River at Adams County which you transmitted to us on September 30, 1986.

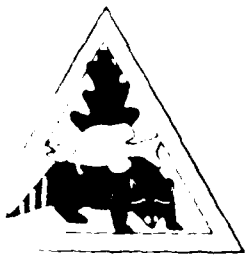
The report is generally satisfactory as written, however, we do recommend that recommendation No. 9 (p. 7) be revised to indicate that work in the tailwaters be completed prior to December 15, as work beyond this date would be potentially disruptive to the eagles which forage for food in the tailwaters.

Thank you for the opportunity to comment.

Sincerely,

Richard W. Lutz
Supervisor, Impact Analysis Section
Division of Planning

RWL:bp



MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

October 22, 1986

Mr. Richard C. Nelson, Field Supervisor
U. S. Fish and Wildlife Service
1830 Second Avenue
Rock Island, Illinois 61201

Dear Mr. Nelson:

Members of my staff reviewed the final Fish and Wildlife Coordination Act Report for the major rehabilitation of Lock and Dam 21. We are pleased that the extension of upstream and downstream guidewalls have been deleted from the proposed work.

Two minor comments:

1. Henslow's sparrow, Ammodrammus henslowii, should be listed as Rare in Missouri on page 4.
2. Prairie white-fringed orchid, Habernaria leucophaea, should be listed as Endangered in Missouri.

We concur with the recommendations found in the report and appreciate the opportunity to review and offer comments.

Sincerely,

ALLEN BROHN
ACTING DIRECTOR

OCT 25 1986

COMMISSION

JEFF CHURAN
Chillicothe

JOHN POWELL
Rolla

JOHN B. MAHAFFEY
Springfield

RICHARD L. REED
East Prairie



JANUARY 21, 1957

1. Name: John A. Hall, District No. Three
 2. Address: 1000 1/2 E. 10th St.
 3. City: Denver
 4. State: Colorado
 5. Date: March 10, 1934
 6. Name of Agent: John A. Hall

1. The following information was obtained from a January 5, 1987 letter
 from the Department of Health, Division of Water, regarding material disposal
 activities at the site of the former Mt. Diablo River Site 327.4.
 2. The Department of Health, Division of Water, Division of water
 resources, has been notified of the proposed disposal.

[illegible][illegible]

JAN 23 1987

Colonel Neil A. Smart

Page 2

January 20, 1987

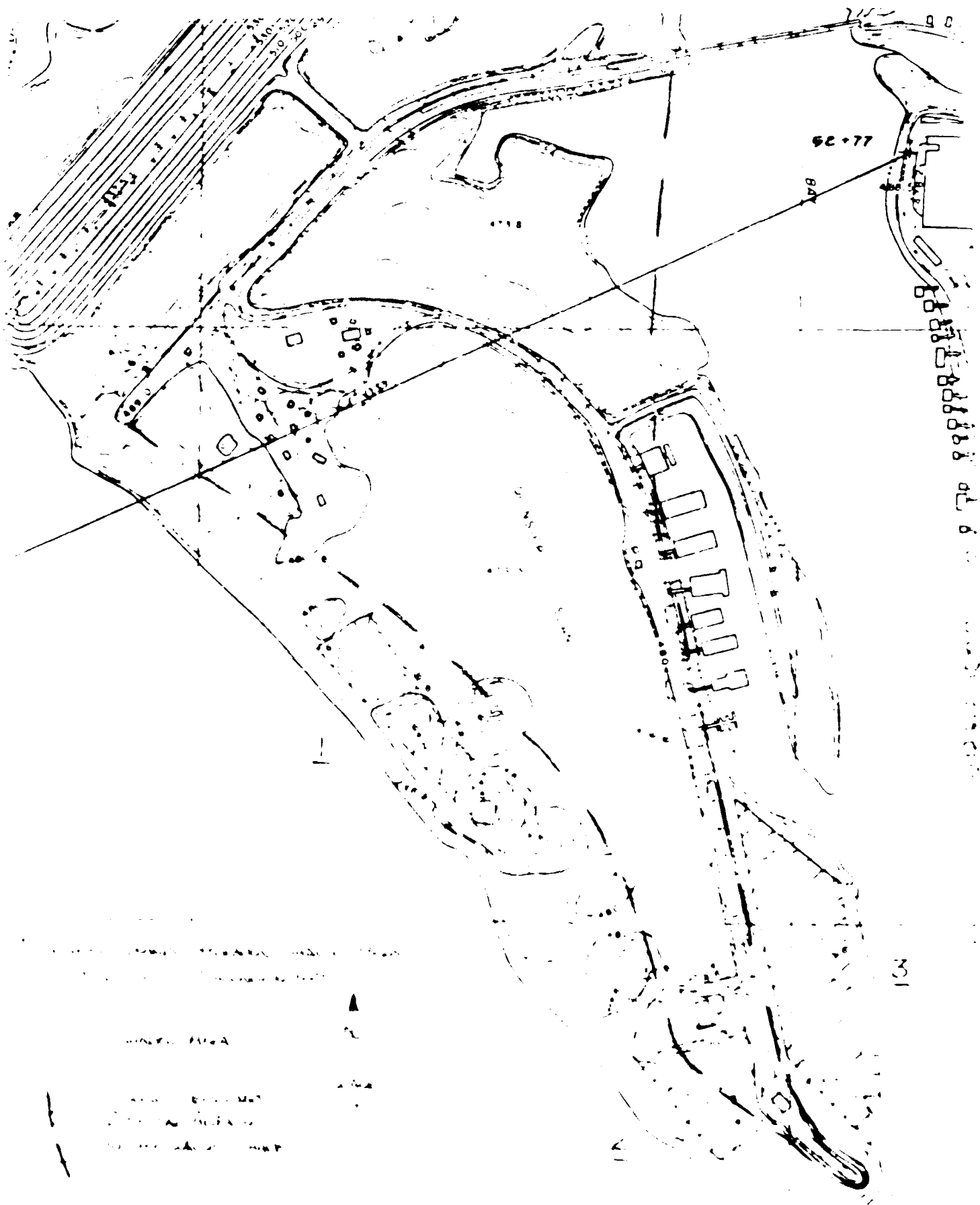
We appreciate the opportunity to review your disposal plans on a preliminary basis. Please feel free to contact Mike Diedrichsen of my staff at 217/782-3862 if you have any questions or comments.

Sincerely,



David R. Boyce, P.E.
Chief Flood Plain Management
Engineer

DKB:MLH:10
Enclosure



62-77

84

13



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY

ROCK ISLAND FIELD OFFICE (ES)

1830 Second Avenue, Second Floor

Rock Island, Illinois 61201

COM: 309-793-5

FTS: 386-5800

January 22, 1987

Colonel V. A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Rock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

From: Planning Division

Subject: Lock and Dam 21

We are pleased to supplement our final Fish and Wildlife Coordination Act Report for the Rock Island Dam 21 Major Rehabilitation Program. Since completion of our final report, dated September 30, 1985, the District has provided us with information concerning the proposed project.

The District completed an analysis of the potential impact on tow approach times that may result from construction of a downstream guard cell. The analysis compared approach times before and after construction of a similar guard cell at Lock and Dam 22. This comparison found no difference in approach times. It did, however, find a reduction in the number of tows following guard cell construction. Based on this analysis, we believe that the lower guard cell proposed for Lock and Dam 21 will have no effect on increasing navigation traffic.

A number of alternatives for disposal of dredged material have been evaluated. We understand that the District's preferred alternative is the use of the Inc. landfill on Lock and Dam Road. We concur with the use of this site as a disposal site. However, we would like to review the dredging and disposal method for this site when it is selected. Although the use of the Inc. Island (see memorandum for record dated November 10, 1986) as a disposal site is preferred, we would concur with their use if need

For information, letters of comment received from the Illinois and U.S. Fish and Wildlife Service are enclosed. Please note that Illinois requested that work in the tailwaters be completed prior to December 15 to avoid impacts to breeding eagles.

If you have any questions, contact Gail Carmody or myself. We are pleased we have been able to resolve the outstanding issues regarding this project.

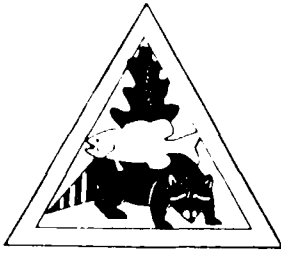
Sincerely,

A handwritten signature in dark ink, appearing to read "Richard C. Nelson". The signature is fluid and cursive, with the first name "Richard" being more prominent than the last name "Nelson".

Richard C. Nelson
Field Supervisor

Enclosures

cc: ILDOC (Lutz)
MODOC (Dieffenbach)
USEPA (Kring)



MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

October 22, 1986

Mr. Richard C. Nelson, Field Supervisor
U. S. Fish and Wildlife Service
1830 Second Avenue
Rock Island, Illinois 61201

Dear Mr. Nelson:

Members of my staff reviewed the final Fish and Wildlife Coordination Act Report for the major rehabilitation of Lock and Dam 21. We are pleased that the extension of upstream and downstream guidewalls have been deleted from the proposed work.

Two minor comments:

1. Henslow's sparrow, Ammodrammus henslowii, should be listed as Rare in Missouri on page 4.
2. Prairie white-fringed orchid, Habernaria leucophaea, should be listed as Endangered in Missouri.

We concur with the recommendations found in the report and appreciate the opportunity to review and offer comments.

Sincerely,

ALLEN BROHN
ACTING DIRECTOR

OCT 25 1986

COMMISSION

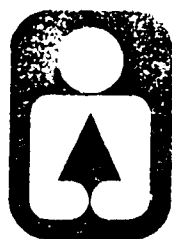
JEFF CHURAN
Chillicothe

JOHN POWELL
Rolla

JOHN B. MAHAFFEY
Springfield

RICHARD T. REED
East Prairie

Illinois



Department of Conservation

life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787
CHICAGO OFFICE • ROOM 4-300 • 100 WEST RANDOLPH 60601
Michael B. Witte, Director • James C. Helfrich, Assistant Director

November 6, 1986

Mr. Richard C. Nelson
Field Supervisor
U.S.D.I.-FWS
Rock Island Field Office(ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

The Department has reviewed the final Fish and Wildlife Coordination Act Report for Lock and Dam 21 proposed major rehabilitation plan, Mississippi River at Adams County which you transmitted to us on September 30, 1986.

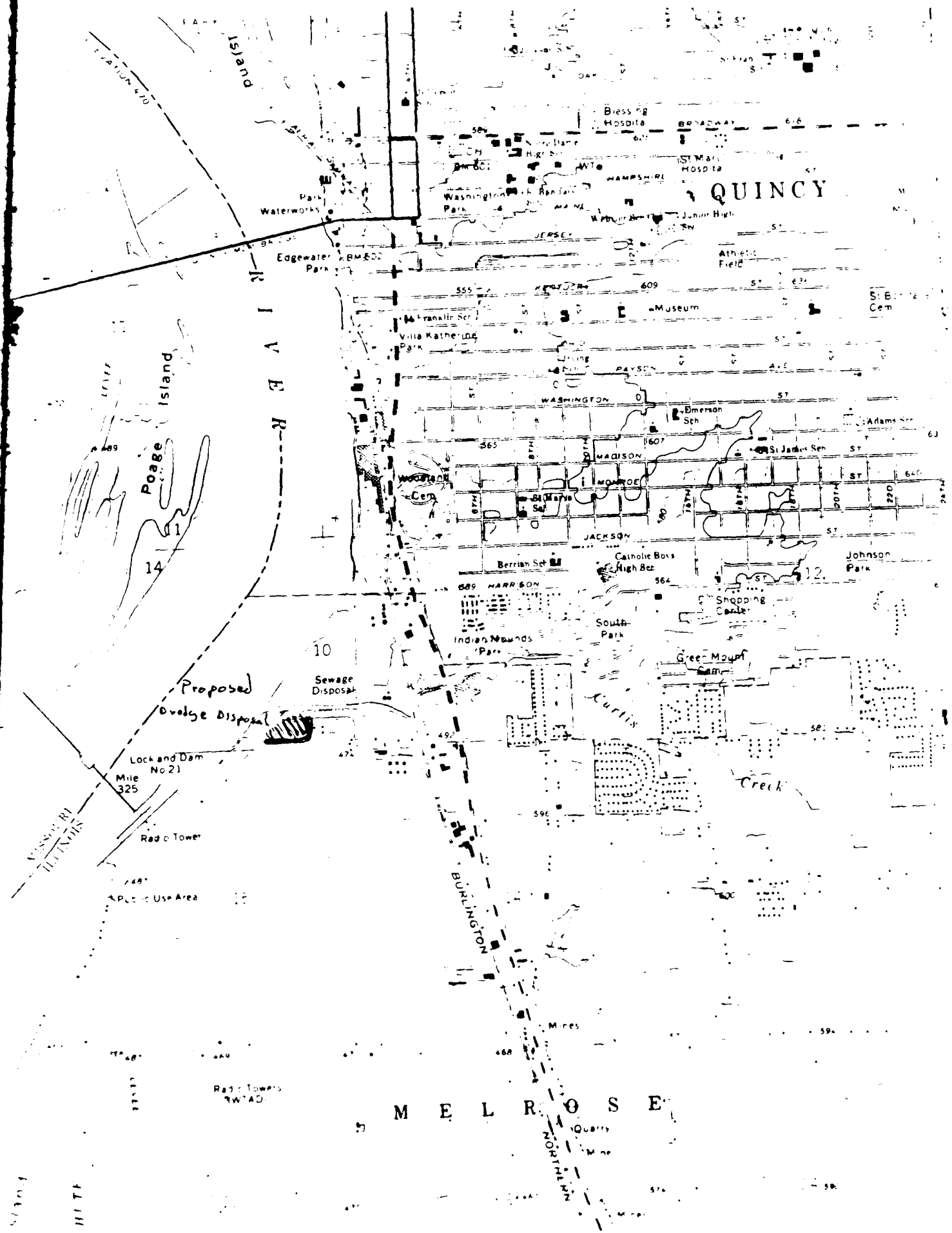
The report is generally satisfactory as written, however, we do recommend that recommendation No. 9 (p. 7) be revised to indicate that work in the tailwaters be completed prior to December 15, as work beyond this date would be potentially disruptive to the eagles which forage for food in the tailwaters.

Thank you for the opportunity to comment.

Sincerely,

Richard W. Lutz
Supervisor, Impact Analysis Section
Division of Planning

RWL:bp



QUINCY

MELROSE

WATER

LEVEL

Radio Towers
9WAD

Quincy
Mass

NORTH

BURLINGTON

Curtis

Creek

Green Mount

South Park

Indian Mounds Park

HARRISON

Berrian St

Catholic Boys High Sch

Johnson Park

Shopping Center

St. James' Sch

Emerson Sch

St. James' Sch

St. James' Sch

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REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P O BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

February 12, 1987

Planning Division

Mr. William G. Farrar
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701

Dear Mr. Farrar:

The Rock Island District is currently considering plans for the disposal of dredged material associated with the rehabilitation of Lock and Dam 21 near Quincy, Adams County, Illinois. In a letter to your agency dated November 25, 1986, the Rock Island District proposed to utilize a portion of Quinsippi Island for dredged material disposal purposes. You concurred with a No Effect determination for this action on December 9, 1986.

Since that time, the District has proposed to utilize an approved Environmental Protection Agency (EPA) landfill site located nearer to the Lock and Dam complex (map attached). The area is currently being used for the disposal of various construction refuse which blankets the area. Due to the previous disturbance of the area, it is our opinion that the proposed disposal activity will have No Effect on significant cultural resources.

Please comment on this project within 30 days. If you have any questions on this action, please call Mr. Kenneth Barr at 309/788-6361, Ext. 349, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Signed By
J. T. SCHNERPE
Dudley M. Hanson, P.E.
Chief, Planning Division

Enclosure

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

DATE

6 March 1987

SUBJECT OF CONVERSATION

Dredge Disposal L & D 21 Rehab

INCOMING CALL

PERSON CALLING

Ken Barr

ADDRESS

NCRPD-E

PHONE NUMBER AND EXTENSION

x349

PERSON CALLED

Jim Yingst

OFFICE

SHPO, IL.

PHONE NUMBER AND EXTENSION

217-785-4999

OUTGOING CALL

PERSON CALLING

OFFICE

PHONE NUMBER AND EXTENSION

PERSON CALLED

ADDRESS

PHONE NUMBER AND EXTENSION

SUMMARY OF CONVERSATION:

Based on a letter from NCR dated 12 Feb 87 the IL SHPO concurs that No Significant historic properties will be effected by dredge disposal at the EPA landfill site (Disposal site 3).

KEN BARR
PD-E

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION



NCRPD-E

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING P.O. BOX 2004
ROCK ISLAND ILLINOIS 61204 2004

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
FOR
LOCK AND DAM 26 MAJOR REHABILITATION
ADAMS COUNTY, ILLINOIS, AND MARION COUNTY, MISSOURI

FEBRUARY 1987

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
FOR
LOCK AND DAM 21 MAJOR REHABILITATION
ADAMS COUNTY, ILLINOIS, AND MARION COUNTY, MISSOURI

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1	Project Location
2	Scour Protection
3	Alternative Disposal Sites

CLEAN WATER ACT
SECTION 504(b)(1) EVALUATION
FOR
LOCK AND DAM #1 MAJOR REHABILITATION
ADAMS COUNTY, ILLINOIS, AND MARION COUNTY, MISSOURI

SECTION 1 - PROJECT DESCRIPTION

LOCATION

Lock and Dam #1 is located at river mile 3.000, spanning the Mississippi from Quincy, Illinois, to West Quincy, Missouri. The lock facility is located on the left descending bank and consists of one 600 foot main lock separated from the dam by an emergency auxiliary set of lock miter gates. Adjacent counties are Adams in Illinois and Marion in Missouri. The project location is shown on Plate 1 - Project Location.

GENERAL DESCRIPTION

As a component of major rehabilitation of the lock and dam facility, it is proposed to dredge material from:

1. Upstream and downstream sections of the emergency auxiliary miter gates;

2. The tailwater of the dam, in a strip roughly 100 feet wide, from the riverside lock wall to the crest of the water portion of the dam;

3. The pool side of the dam, in a strip roughly 60 feet wide, from the riverside lock wall to the crest of the land portion of the dam.

It is noted that previous descriptions of the project design, however, some items of this equipment will not require material removal. Some dredging is anticipated across most of the dam, with some holes armored, versus filled to level grade.

Construction to commence following completion of Items 2, 3, and 4 will involve a guard cell, downstream scour protection, and upstream scour protection, respectively. Concrete filled cell construction is permitted under the authority of a Nationwide Permit, 33 CFR, Parts 320 through 330. No dredging is anticipated for cell construction.

A. AUTHORITY AND PURPOSE

The project is to be implemented under the authority of the River and Harbor Act of October 3, 1917, which authorized the "Upper Mississippi River Nine-Foot Channel Navigation Project." Operation and maintenance of Lock and Dam 12 is included in that authorization.

The purpose of the project is major rehabilitation of an existing facility, which is a component of the Upper Mississippi River Nine-Foot Channel Navigation Project. Lock and Dam 12 is a unit of the Inland Waterway Navigation System of the Upper Mississippi River Basin.

GENERAL DESCRIPTION OF PROPOSED AND FILL MATERIAL TO BE PLACED BELOW THE PRIMARY HIGH WATER MARK

Material to be used for scour protection extension will consist of derrick stone and rock fill. Rock to be used for riprap and fill is limestone and is hard, strong, and fairly physically stable and chemically nonconspicuous. Existing material will be removed and deposited in a commercial aggregate storage area on site. Total material removed will be approximately 1,000,000 cubic yards. The scour protection will consist of derrick stone on the approach below the dam, the rock fill will be 2.5 feet thick and extend 100 feet beyond the existing rock protection. The derrick stone will be 24 inches in diameter and will cross 100 feet for a distance of 20 feet beyond the existing rock protection. Above the dam, the rock fill will be 2.5 feet thick and extend 100 feet beyond the existing rock protection. The derrick stone above the dam will be placed on the rock fill and will cross 100 feet for a distance of 10 feet beyond the existing rock protection. Refer to Plate 1 for Scour Protection.

The approach to the overflow section will be covered with a 6 inch layer of rock material. The walls of the existing slash concrete approach will be replaced with gravity to be placed on the overflow section. The approach will be 12 feet wide.

The material to be removed and placed in the existing material. The total quantity of fill removal is about 25,000 cubic yards. Stone gradations and quantity estimates are shown below on separate sheets, respectively.

TABLE 1

Stone Gradations

Percent Smaller by Weight	Limits of Weights of Stone (lbs.)	
	<u>Rock Fill</u>	<u>Riprap</u>
100	400-200	2,000-950
75	180-90	830-460
50	50-25	400-200

[illegible]

material affected by scour collection extension involves picked sand substrate immediately upstream and downstream of the dam. Portions of this substrate will be elevated to varying depths prior to discharge of rock tail and ripstone. Due to the location, water velocity generally reduces the bottom-dwelling, or benthic, community to the burrowing invertebrates. No mussel community is anticipated to exist under conditions typically found at or immediate to the stilling basin of a dam of this type.

Discharge of rock fill and capstone, for scour protection, will take place during low flow periods typically encountered during the summer months. This work will require alteration of the dam regulation schedule to allow plant and equipment to work in the dam headwater and tailwater areas. Placement of rock fill and capstone may take up to 4 weeks, depending on river stages. Dredging with a mechanical dredge and contained disposal of fine material from the auxiliary lock may take up to 6 weeks, depending on conditions encountered during the operation.

Placement of material for scour protection typically involves the use of deck-mounted cranes and/or derricks, deck barges, endloaders, quarter boats, and tender craft. Materials are dumped to alignment and spread:

... (derrick stone) is placed by crane or ...
... finer material from the auxiliary lock area will ...
... the use of a deck-mounted crane and clamshell bucket.
... to Quinsippi Island to allow for revegeta-
... Following settling and consolidation, dredged
... elevations suitable for landscaping or
... at this time, disposal of all material is planned
... near the work site.

SECTION 2 - FACTUAL DETERMINATIONS

FACTUAL DETERMINATIONS

Lock and Dam 21 was constructed on a Mississippi riverbed cross section consisting primarily of sand, gravel, and finer alluvial material. The facility is built on wooden piles driven into the riverbed.

Sediments accumulated over the period of operation of the facility are primarily silts and clays in the emergency lock area, where slack water has allowed finer suspended material to drop out of the water column. Sediments accumulated in the tailwater of the dam vary from location to location across the profile. From the auxiliary lock riverwall to the storage yard, little deposition typically occurs due to the higher velocities resulting from the use of these gates for pool level control. Sediments that could deposit here would typically be coarse sand and larger material. From the storage yard westward, the overflow crest of the dam creates a slack water area, and deposition of silt and material occurs. However, due to annual flushing during ... periods, percentages of fine material present at any time ... would be variable. Fine material percentages generally ... distance away from the dam.

Deposition of rock fill and capstone armorment on cross sections is intended to stabilize ... cutting of existing scour protection.

Deposition of dredged material ... would involve placement on ... city. Quinsippi Island ... east side; riverwall ... and ... dredged ...

...

...

AD-A184 348

ENVIRONMENTAL ASSESSMENT FOR LOCK AND DAM 21 MAJOR
REHABILITATION MARION COUNTY MISSOURI AND ADAMS COUNTY
ILLINOIS (U) ARMY ENGINEER DISTRICT ROCK ISLAND IL

2/2

UNCLASSIFIED

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FIG 13/2

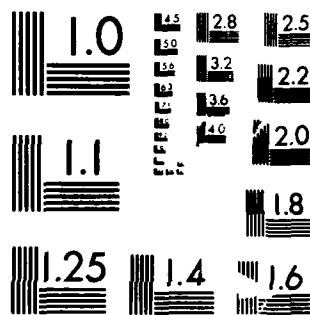
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Division of Water Resources. The disposal of up to 25,000 cubic yards of fine sediments from the auxiliary lock area is of primary concern. These sediments have been analyzed for various chemical parameters, with results of analyses being shown on tables 3 and 5. Physical and chemical composition of this material was considered when selecting a disposal site.

WATER CIRCULATION, FLUCTUATION, AND SALINITY DETERMINATIONS

WATER

The project will take place in and around an inland freshwater stream system. Materials used, or discharged, during the project action are anticipated to be chemically stable. Therefore, no further consideration of salinity gradient is warranted for this action.

Water and sediment samples were taken during the summer of 1986. These samples were taken in the auxiliary lock area of the project site and were analyzed for ambient water, bulk sediment, and elutriate parameters and were compared to Missouri and Illinois water quality standards. Test results are found in the following tables. The ambient water concentration of iron exceeded the State standards; however, most metal concentrations were below their respective detection limits. All pesticide concentrations were below the detection limit at all sites. Results are shown in table 3.

Missouri and Illinois do not have sediment quality standards; therefore, sediment quality was evaluated using the 1977, U.S. EPA publication entitled "Guidelines for the Pollutional Classification of Great Lakes Sediments." This publication classifies a sediment as being "nonpolluted," "moderately polluted," or "heavily polluted," depending on the concentration of selected parameters in the sediment. Table 4 lists the parameters studied in the U.S. EPA publication and their classification scheme.

The results of Lock and Dam 21 bulk sediment analyses are shown in table 5. Three parameters, barium, lead, and ammonia nitrogen, exhibit concentrations at one or more sites that place them in the "heavily polluted" category. Cyanide, mercury, polychlorinated biphenyls, and all pesticide concentrations, except for 2,4-D were below the detection limit at all four sites. No site at Lock and Dam 21 appeared to be significantly more "polluted" than another. In most cases, the concentrations of each parameter were similar among the four sites.

The elutriate test is used to simulate return flow conditions that would occur during dredged material disposal. Five different elutriate settling times were used in the current study: 1, 8, 24, 48 and 96 hours. All 35 elutriate parameters were analyzed when a 1-hour settling time was used. When an 8-, 24-, 48- or 96-hour settling time was used, only 17 parameters were analyzed. Elutriate analysis results were evaluated against Missouri Protection of Aquatic Life Standards and Illinois General Use Water Quality Standards.

TABLE 3

Ambient Water Concentrations of All Parameters
at Lock and Dam 21 on 7 August 1986
(in mg/l, unless stated otherwise)

Parameter	Location	
	LD21-D3	LD21-U2
Arsenic	<.01	<.01
Barium	<.1	<.1
Cadmium	.003	.002
Chromium (+3)	<.05	<.05
Chromium (+6)	<.05	<.05
Copper	<.01	<.01
Cyanide	<.01	<.01
Lead	.03	.01
Mercury	<.0005	<.0005
Nickel	<.01	<.01
Selenium	.003	<.002
Zinc	.03	.02
Ammonia Nitrogen	.18	.12
Un-ionized Ammonia	.01	.008
Nitrate Nitrogen	1.7	1.4
BOD	8	8
Oil and Grease	1	1
Phenols	<.01	.05
PCBs	<.0002	<.0002
Total Phosphate	.73	.82
Iron	1.2 *+	1.2 *+
Manganese	.15	.15
Total Suspended Solids	67	72
Total Dissolved Solids	233	238
Total Volatile Solids	116	120
Volatile Suspended Solids	6	4
Aldrin	<.00001	<.00001
Chlordane	<.00001	<.00001
DDD	<.0001	<.0001
DDE	<.0001	<.0001
DDT	<.0001	<.0001
Dieldrin	<.00001	<.00001
Endrin	<.00001	<.00001
Heptachlor	<.00001	<.00001
Heptachlor Epoxide	<.00001	<.00001
Lindane	<.00001	<.00001
Methoxychlor	<.01	<.01
Toxaphene	<.0002	<.0002
2,4-D	<.01	<.01
2,4,5-TP	<.001	<.001
Temperature (°C)	25.3	25.1
pH	8.06	8.05
Turbidity (NTU)	33	32
Dissolved Oxygen	7.78	7.75
Conductivity	442	449
(umhos/cm at 25°C)		

* Exceeds Missouri Protection of Aquatic Life Standard

+ Exceeds Illinois General Use Water Quality Standard

TABLE 4

U.S. EPA Guidelines for the Pollutational
Classification of Great Lakes Harbor Sediment
(in mg/kg dry weight)

<u>Parameter</u>	<u>Nonpolluted</u>	<u>Moderately Polluted</u>	<u>Heavily Polluted</u>
Ammonia nitrogen	<75	75-200	>200
Arsenic	<3	3-8	>8
Barium	<20	20-60	>60
Cadmium	*	*	>6
Chromium	<25	25-75	>75
Copper	<25	25-50	>50
Cyanide	<0.10	0.10-0.25	>0.25
Lead	<40	40-60	>60
Mercury **	-	-	-
Nickel	<20	20-50	>50
Oil and grease	<1000	1,000-2,000	>2,000
PCBs **	-	-	-
Total volatile *** residue	<5	5-8	>8
Zinc	<90	90-200	>200

* Lower limits not established for cadmium

** If the concentrations of mercury or total PCBs are greater than or equal to 1 mg/kg or 10 mg/kg, respectively, the sediment is classified as polluted

*** Total volatile residue is expressed as a percent

TABLE 5

Bulk Sediment Concentrations of All Parameters
in mg/kg Dry Weight, or as Stated Otherwise, at
Lock and Dam 21 on 7 August 1986

Parameter	Location			
	LD22-D2	LD22-D4	LD22-U1	LD22-U3
Arsenic	2.4	3.0	1.9	1.8
Barium	115 *	122 *	85 *	114 *
Cadmium	1.0	1.3	.85	.94
Chromium	15	21	13	16
Copper	12	21	11	14
Cyanide	<.1	<.1	<.1	<.1
Lead	61 *	30	16	22
Mercury	<.1	<.1	<.1	<.1
Nickel	21	26	18	21
Selenium	4.1	<1.0	<1.0	<1.0
Zinc	61	85	49	65
Ammonia nitrogen	228 *	299 *	167	234 *
BOD	404	147	243	130
Oil and grease	142	92	45	66
PCBs	<.2	<.2	<.2	<.2
% Total iron	1.6	1.9	1.3	1.7
Manganese	940	990	530	580
% Total residue	55.7	49.0	64.1	66.1
% Total volatile residue	5.6	6.9	4.3	5.4
Aldrin	<.005	<.005	<.005	<.005
Chlordane	<.025	<.025	<.025	<.025
DDD	<.01	<.01	<.01	<.01
DDE	<.005	<.005	<.005	<.005
DDT	<.01	<.01	<.01	<.01
Dieldrin	<.005	<.005	<.005	<.005
Endrin	<.01	<.01	<.01	<.01
Heptachlor	<.005	<.005	<.005	<.005
Heptachlor epoxide	<.005	<.005	<.005	<.005
Lindane	<.005	<.005	<.005	<.005
Methoxychlor	<.01	<.01	<.01	<.01
Toxaphene	<.05	<.05	<.05	<.05
2,4-D	.50	.36	.46	.84
2,4,5-TP	<.01	<.01	<.01	<.01

* U.S. EPA guidelines for the classification of Great Lakes harbor sediments place this concentration in the "heavily polluted" category

Results from the elutriate analyses, as shown in tables 6 through 9, indicate that ammonia nitrogen (including its un-ionized form) would be the parameter of main concern if sediment adjacent to the auxiliary lock gates at Lock and Dam 21 were hydraulically dredged and the material disposed of in Missouri or Illinois. Other parameters which may exceed Missouri and/or Illinois water quality standards if dredged material disposal were to occur hydraulically are arsenic, lead, mercury, copper, and selenium. Proposed mechanical dredging may serve to reduce quantities in bulk, rather than slurry form. However, turbidity levels are typically higher at the work site with mechanical dredging.

If dredging were to occur during the fall or spring when water temperatures and pH values are lower, un-ionized ammonia nitrogen concentrations would be lower; therefore, there would be fewer violations of this standard.

Settling time appears to be an important factor affecting the concentration of numerous parameters. Heavy metals, which are closely associated with sediment, usually exhibited decreasing concentrations as settling times increased; however, ammonia, which is a dissolved parameter, usually showed little change with increased settling times. Results from the elutriate analyses indicate that an 8-hour settling period usually would result in a decrease in heavy metal concentrations versus a 1-hour settling period. Ammonia concentrations, however, usually showed little change as the settling time was increased.

Bulk sediment analysis results tended to indicate that barium could cause problems; however, the elutriate test results indicate that barium concentrations would not exceed either State standard.

Iron was the only ambient water parameter to exceed a State standard. Iron probably did not exceed Missouri or Illinois State standards in the elutriate analyses because the iron in the ambient water was associated with suspended particles, which apparently settled out during the settling stage of the elutriate test.

Sediment sampling and analyses at Lock and Dam 21 centered around material anticipated to be primarily silt to clay-size particles. Typically, analysis of sand sediments, such as found immediately above and below the dam, reveals little evidence of pollutants due to the limited surface area of sand-size particles, relative to clay or silt-size particles, and the lack of strong chemical bonding of contaminants to sand grains. Examination of boring log gradation curves indicate that dredged material will not contain over 10 percent fine material. Therefore, no pollutant analysis was performed on sandy material at Lock and Dam 21.

Any contaminants contained in sandy materials removed from the pool or tailwater would be those typically contained or transported by normal fluvial processes and therefore common constituents of the Mississippi River system. Disposal of sandy material excavated from the dam area would therefore not be anticipated to alter water chemistry in the water column, as return water reaches the Mississippi River.

TABLE 6

Elutriate Concentrations of All Parameters (mg/l) at LD21-D2
from Samples Collected on 7 August 1986

Parameter	Settling Time				
	1-Hour	8-Hour	24-Hour	48-Hour	96-Hour
Arsenic	.01	<.01	<.01	<.01	.02
Barium	.27	.15	.28	<.01	.18
Cadmium	.002	.002	.002	.003	.003
Chromium	<.01	<.01	<.01	<.01	<.01
Copper	.02	<.01	<.01	<.01	<.01
Cyanide	<.01	<.01	<.01	<.01	<.01
Lead	.07 *	.06 *	.06 *	.04	.02
Mercury	<.0005	<.0005	.0056 **	.0013 +	<.0005
Nickel	.05	.03	.03	.02	.02
Selenium	.013	.007	.006	.008	.010
Zinc	.06	.01	<.01	<.01	<.01
Ammonia nitrogen	11.5 **	11.9 **	10.6 **	11.5 **	14.1 **
Un-ionized ammonia	.76 **	.78 **	.70 **	.76 **	.93 **
BOD	20	7	41	22	4
Oil and grease	1	-	-	-	-
PCBs	<.0002	-	-	-	-
Iron	.26	-	-	-	-
Manganese	.56	-	-	-	-
Total residue	1,060	506	465	461	466
Total suspended solids	510	110	59	41	40
Total volatile residue	189	122	106	112	117
Aldrin	<.00001	-	-	-	-
Chlordane	<.00001	-	-	-	-
DDD	<.0001	-	-	-	-
DDE	<.0001	-	-	-	-
DDT	<.0001	-	-	-	-
Dieldrin	<.00001	-	-	-	-
Endrin	<.00001	-	-	-	-
Heptachlor	<.00001	-	-	-	-
Heptachlor epoxide	<.00001	-	-	-	-
Indane	<.00001	-	-	-	-
Methoxychlor	<.01	-	-	-	-
Toxaphene	<.0002	-	-	-	-
2,4-D	<.01	-	-	-	-
2,4,5-TP	<.001	-	-	-	-

* Exceeds Missouri Protection of Aquatic Life Standard

+ Exceeds Illinois General Use Water Quality Standard

TABLE 7

Elutriate Concentrations of All Parameters (mg/l) at LD21-D4
from Samples Collected on 7 August 1986

Parameter	Settling Time				
	1-Hour	8-Hour	24-Hour	48-Hour	96-Hour
Arsenic	.01	<.01	<.01	.01	.03 *
Barium	.16	.35	.10	<.1	.19
Cadmium	.003	.003	.004	.002	.003
Chromium	<.01	<.01	<.01	<.01	<.01
Copper	.02	<.01	<.01	<.01	<.01
Cyanide	<.01	<.01	<.01	<.01	<.01
Lead	.05	.06 *	.05	.06 *	.07 *
Mercury	<.0005	<.0005	.0005	.0013 +	.0013 +
Nickel	.03	.02	.04	.04	.01
Selenium	.010	.010	.004	.004	.037 *
Zinc	.03	<.01	.01	<.01	<.01
Ammonia nitrogen	11.7 **	12.0 **	11.8 **	12.6 **	17.2 **
Un-ionized ammonia	.77 **	.79 **	.78 **	.83 **	1.13 **
BOD	28	45	36	15	3
Oil and grease	1	-	-	-	-
PCBs	<.0002	-	-	-	-
Iron	.49	-	-	-	-
Manganese	.48	-	-	-	-
Total residue	807	524	476	507	466
Total suspended solids	310	86	48	42	60
Total volatile residue	245	109	114	93	116
Aldrin	<.00001	-	-	-	-
Chlordane	<.00001	-	-	-	-
DDD	<.0001	-	-	-	-
DDE	<.0001	-	-	-	-
DDT	<.0001	-	-	-	-
Dieldrin	<.00001	-	-	-	-
Endrin	<.00001	-	-	-	-
Heptachlor	<.00001	-	-	-	-
Heptachlor epoxide	<.00001	-	-	-	-
Lindane	<.00001	-	-	-	-
Methoxychlor	<.01	-	-	-	-
Toxaphene	<.0002	-	-	-	-
2,4-D	<.01	-	-	-	-
2,4,5-TP	<.001	-	-	-	-

* Exceeds Missouri Protection of Aquatic Life Standard

+ Exceeds Illinois General Use Water Quality Standard

TABLE 8

Elutriate Concentrations of All Parameters (mg/l) at LD21-U1
from Samples Collected on 7 August 1986

Parameter	Settling Time				
	1-Hour	8-Hour	24-Hour	48-Hour	96-Hour
Arsenic	.01	.01	<.01	.01	.02
Barium	.27	.18	.25	.18	.12
Cadmium	.003	.002	.003	.002	.003
Chromium	<.01	<.01	<.01	<.01	<.01
Copper	.02	<.01	<.01	<.01	<.01
Cyanide	<.01	<.01	<.01	<.01	<.01
Lead	.05	.03	.05	.04	.03
Mercury	<.0005	<.0005	<.0005	<.0005	.0007 +
Nickel	.03	.03	.02	.02	.03
Selenium	.011	.006	.003	<.002	.023 *
Zinc	.08	.02	.02	<.01	.02
Ammonia nitrogen	6.3 **	6.5 **	6.9 **	6.7 **	7.5 **
Un-ionized ammonia	.40 **	.41 **	.43 **	.42 **	.48 **
BOD	12	19	36	16	1
Oil and grease	3	-	-	-	-
PCBs	<.0002	-	-	-	-
Iron	.26	-	-	-	-
Manganese	.48	-	-	-	-
Total residue	1,170	489	479	457	410
Total suspended solids	825	163	76	30	56
Total volatile residue	193	137	101	90	80
Aldrin	<.00001	-	-	-	-
Chlordane	<.00001	-	-	-	-
DDD	<.0001	-	-	-	-
DDE	<.0001	-	-	-	-
DDT	<.0001	-	-	-	-
Dieldrin	<.00001	-	-	-	-
Endrin	<.00001	-	-	-	-
Heptachlor	<.00001	-	-	-	-
Heptachlor epoxide	<.00001	-	-	-	-
Lindane	<.00001	-	-	-	-
Methoxychlor	<.01	-	-	-	-
Toxaphene	<.0002	-	-	-	-
2,4-D	<.01	-	-	-	-
2,4,5-TP	<.001	-	-	-	-

* Exceeds Missouri Protection of Aquatic Life Standard

+ Exceeds Illinois General Use Water Quality Standard

TABLE 9

Elutriate Concentrations of All Parameters (mg/l) at LD21-U3
from Samples Collected on 7 August 1986

Parameter	Settling Time				
	1-Hour	8-Hour	24-Hour	48-Hour	96-Hour
Arsenic	.04 *	.02	.02	.02	.03 *
Barium	.18	.32	.16	.21	.27
Cadmium	.005	.003	.002	.001	.002
Chromium	.04	<.01	<.01	<.01	<.01
Copper	.07 **	.03 **	.03 **	.02	<.01
Cyanide	<.01	<.01	<.01	<.01	<.01
Lead	.14 **	.08 *	.08 *	.05	.03
Mercury	<.0005	<.0005	<.0005	.0008 +	.0008 +
Nickel	.08	.03	.02	<.01	.01
Selenium	.017 *	<.002	.004	.018 *	<.002 *
Zinc	.08	.07	.06	.02	.02
Ammonia nitrogen	16.0 **	14.6 **	16.3 **	17.4 **	20.2 **
Un-ionized ammonia	1.02 **	.93 **	1.04 **	1.11 **	1.28 **
BOD	8	7	17	10	7
Oil and grease	1	-	-	-	-
PCBs	<.0002	-	-	-	-
Iron	.11	-	-	-	-
Manganese	.08	-	-	-	-
Total residue	2,570	1,040	728	496	466
Total suspended solids	860	400	188	140	83
Total volatile residue	409	201	156	105	91
Aldrin	<.00001	-	-	-	-
Chlordane	<.00001	-	-	-	-
DDD	<.0001	-	-	-	-
DDE	<.0001	-	-	-	-
DDT	<.0001	-	-	-	-
Dieldrin	<.00001	-	-	-	-
Endrin	<.00001	-	-	-	-
Heptachlor	<.00001	-	-	-	-
Heptachlor epoxide	<.00001	-	-	-	-
Lindane	<.00001	-	-	-	-
Methoxychlor	<.01	-	-	-	-
Toxaphene	<.0002	-	-	-	-
2,4-D	<.01	-	-	-	-
2,4,5-TP	<.001	-	-	-	-

* Exceeds Missouri Protection of Aquatic Life Standard

+ Exceeds Illinois General Use Water Quality Standard

Clarity, or turbidity, of the river varies with seasonal flow. Disposal sites and methods have been selected to minimize impact to clarity, color, odor, taste, dissolved gas levels, nutrients, and biochemical oxygen demand in the riverine environment. Discharge of rock will stabilize finer substrate materials; terrestrial disposal of fine silt and clay will minimize water quality impacts and provide material for beneficial agricultural and municipal use. Any return water reaching the bankline is anticipated to have only a localized short-term effect. Bank materials will be protected as necessary for erosion control during discharge flow.

Non-riverine originated components such as rock fill, capstone, concrete, and steel which may be placed temporarily or permanently during construction will be physically stable and chemically noncontaminating.

CURRENT PATTERNS AND CIRCULATION

Placement of rock fill and capstone for scour protection is not anticipated to negatively affect current patterns, velocity, stratification, nor hydrologic regime in the river system. However, scour protection is anticipated to reduce local scouring caused by through-dam current patterns.

Terrestrial discharge of material excavated from the emergency lock should have no effect on hydraulic or hydrologic conditions in the project area. Terrestrial disposal of sand material should not affect hydraulic or hydrologic conditions in the project area.

NORMAL WATER LEVEL FLUCTUATIONS

No effects on normal seasonal river stages are anticipated by the project actions.

SALINITY GRADIENTS

Refer to first paragraph under "Water," preceding.

ACTIONS TAKEN TO MINIMIZE IMPACTS

The use of chemically stable materials, physical stabilization of materials by design, and terrestrial disposal of fine, silty material are actions intended to reduce impacts to the riverine system. Proposed mechanical dredging of fine material is intended to reduce contaminant and sediment resuspension at the disposal site, which typically occurs with hydraulic dredging.

SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS

The discharge of rock for scour protection is anticipated to have only a minor temporary effect as the material is placed and spread to design elevation.

Disposal of sand material on Quinsippi Island or the preferred landfill may allow return water to reenter the Mississippi water column. Due to the negligible amount of fine particulates contained in this sand material, any increase in turbidity and suspended particulate concentration is anticipated to be localized and temporary during the period of the disposal action.

Effects on the water column of the river system regarding light penetration, dissolved oxygen, toxic metals and organics, pathogens, and aesthetics are anticipated to be minimal and localized for a nominal distance downstream during the term of project construction.

Some potentially toxic materials have been identified in materials to be dredged from the river system. Concentrations of these materials in return water which could potentially exceed water quality standards for elutriate, are anticipated to be minimized through the dredge method for fine materials (mechanical), and the disposal site selection (terrestrial) planned for this project.

DREDGING AND DISPOSAL

Effects on biota, including primary producers, i.e., zoo- and phytoplankton, suspension/filter feeders, and sight feeders are anticipated to be temporary and localized. Factors influencing these biotic components generally revolve around turbidity levels, which inhibit primary production by reducing light penetration, thereby affecting the entire food web of the riverine environment. Because the duration of increased turbidity levels is anticipated to be minimal, localized, and temporary, impacts to the aquatic community are anticipated to be negligible. The project component which will produce a habitat alteration, scour protection extension, is anticipated to provide long-term benefit via stabilization of finer sediments. Benefits are anticipated from municipal use of dredged material. Incorporation of disposed silt is anticipated to provide long-term benefits.

Impacts are anticipated to be minimized by disposal site selection dredging methodology, and the use of chemically noncontaminating and physically stable materials for project construction.

CONTAMINANT DETERMINATIONS

No dredged material contaminants have been identified which require special handling or treatment beyond that currently proposed for the project.

Contaminants identified from elutriate and bulk sediment analyses are generally part of the modern riverine system and are commonly suspended, transported, and deposited through normal fluvial processes in the Mississippi River.

AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

Because the likelihood of contamination by pollutants is generally low for projects involving rock placement, terrestrial disposal, and disposal of sand sediments, impacts to the aquatic ecosystem are anticipated to be negligible.

Review and consideration of 40 CFR, Section 230, Subparts D, E, F, and G involved analysis of the following effects:

- a. Effects on Plankton
- b. Effects on Benthos
- c. Effects on Nekton
- d. Effects on Aquatic Food Web (refer to section 230.31)
- e. Effects on Special Aquatic Sites Found in Project Area or Disposal Site.
 - (1) Sanctuaries and Refuges (refer to Section 230.40)
 - (2) Wetlands (refer to Section 230.41)
 - (3) Mud Flats (refer to Section 230.42)
 - (4) Vegetated Shallows (refer to Section 230.43)
 - (5) Coral Reefs (refer to Section 230.44)
 - (6) Riffle and Pool Complexes (refer to Section 230.45)
- f. Threatened and Endangered Species (refer to Section 230.30)
- g. Other Wildlife (refer to Section 230.32)

Effects on plankton are anticipated to be minimal. Effects on benthos will be limited to elimination of those organisms currently inhabiting the immediate scour protection site. The placement of rock fill for scour protection should provide interstitial spaces for invertebrate population production and vertebrate spawning activity. Effects on nekton will be limited to displacement and temporary disruption of foraging patterns. Because the proposed activities are generally held to low-flow (hence, non-spawning seasons), impacts to spawning species should be negligible. Impacts regarding various behavioral patterns during winter high stress periods would be restricted to the project site due to ice coverage and resultant weather-related construction restrictions. Effects on the aquatic food web are expected to be negligible. Effects on special aquatic sites should be negligible in the project area; no sanctuaries or refuges will be affected by the project action. No wetland or mudflats will be affected by the project actions. No vegetated shallows, coral reefs, nor riffle and pool complexes will be affected by the project action.

Threatened and endangered species use of, or existence in, the project area is discussed in Section VI, Paragraph A, Endangered Species in the preceding environmental assessment.

Other wildlife, such as the river otter, muskrat, and beaver which would move through and around the project area, should only be affected to the extent of travel disruption. No food chain or critical habitat requirements will be significantly affected by the proposed actions.

PROPOSED DISPOSAL SITE DETERMINATIONS

The mixing zone for discharge of rock fill will be the water column, approximately 20 feet deep in the pool and tailwater areas immediately adjacent to the dam. Dam gates will be closed sequentially to allow floating plant access to the construction site. This is anticipated to reduce current velocity and turbulence in order to facilitate fill placement. Depending on river conditions, this discharge may take several weeks to complete. The lack of fine particulates typically contained in rock fill indicates negligible chemical or turbidity effects resulting from this action.

The mixing zone for sand material discharge effluent at the landfill or on Quinsippi Island would be the Mississippi River shoreline water column near the discharge site. The low level of suspendable particulates typically contained in dredged sand material indicates that turbidity and chemical impacts to the water column of the Mississippi River would be negligible.

Water quality standards for Missouri and Illinois are represented on table 10. Test results indicate that ammonia and un-ionized ammonia-nitrogen are the most likely water quality standards which may be violated by the project activity. However, the proposed dredging and disposal methods for material containing all contaminants are expected to minimize contaminant reintroduction to the water column.

The proposed project should have no effect on municipal or private water supplies, recreational or commercial fisheries, or water-related recreation. Aesthetics are generally negatively affected by any type of construction activity; however, for this project, no permanent effects are anticipated due to lack of visibility or structures (underwater) and location of other disposal sites. A parcel of commercial land owned by a construction firm is the site preferred for dredged disposal. Aesthetic impacts from presence of disposal equipment are anticipated to be temporary. Use of this area has been coordinated with, and considered acceptable by, appropriate Federal, State, and local officials.

TABLE 10

Illinois General Use Water Quality Standards and Missouri
Protection of Aquatic Life Standards in mg/l for Comparison
Against Applicable Ambient Water and Elutriate Parameters

<u>Parameter</u>	<u>Illinois General Use Water Quality Standard</u>	<u>Missouri Protection of Aquatic Life Standard</u>
Ammonia nitrogen	*	-
Arsenic	1.0	0.02
Barium	5.0	-
Cadmium	0.05	0.012
Chromium (+3)	1.0	-
Chromium (+6)	0.05	-
Chromium (Total)	-	0.05
Copper	0.02	0.02
Cyanide	0.025	0.005
Iron	1.0	1.000
Lead	0.1	0.05
Manganese	1.0	-
Mercury	0.0005	0.002
Nickel	1.0	0.100
Phenols	0.1	0.100
Selenium	1.0	0.01
Total dissolved solids	1,000	-
Un-ionized ammonia nitrogen	*	0.1
Zinc	1.0	0.100

* Ammonia nitrogen shall never exceed 15 mg/l. If ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then un-ionized ammonia nitrogen shall not exceed 0.04 mg/l.

DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

Due to the somewhat unstable benthic environment above and below the existing scour protection, the placement of rock fill and capstone in this area is expected to stabilize part of the local substrate. This stabilization effort should provide crevices and interstices in which certain aquatic organisms can feed and reproduce. In terms of habitat diversity, therefore, scour protection will have a net positive effect on the aquatic ecosystem.

Terrestrial disposal of fine material from the emergency lock area and sand material from scour protection excavation are anticipated to produce negligible effects on the aquatic ecosystem.

DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

No secondary effects on the aquatic ecosystem are foreseen at this time. This determination is subject to reevaluation, if warranted by Federal, State, or local agency comment, as well as input from the general public.

SECTION 3 - FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

1. No significant adaptations of the 404(b)(1) guidelines were made relative to this evaluation.

2. Evaluation of Practicable Alternatives (Refer to EA Sections III and VII.)

a. No Federal Action. This alternative was not selected because:

(1) Sediment removal from the emergency/auxiliary lock is necessary for rehabilitation activities in both the emergency/auxiliary and main locks.

(2) Excavation for scour protection is necessary for stabilization of the dam structure substrate.

b. Hogback Island (GREAT 21.36). This site is approximately 7 miles away, with use currently restricted to beach nourishment, that is, only relatively pure sand disposal. The material to be removed from the dam pool and tailwater areas is anticipated to contain a variety of coarse materials in addition to sand. This material and the fine material from the auxiliary lock area are not suitable for beach nourishment. The site is a high use recreation area for local boaters. The addition of coarse and fine material could render the site unusable for this purpose. Wildlife use of this area is limited due to lack of cover and human activity; therefore, impacts to wildlife are anticipated to be minimal. This area is referred to as site 4 on Plate 3 - Alternative Disposal Sites.

c. Agricultural Field, Missouri (GREAT 21.48). This site is located inside the West Quincy Levee at the western end of the dam. This site would be suitable for disposal of silty sediment, with sand disposal on the inner levee face. Wildlife use of the actual field is limited to the growing season. However, wildlife use of the levee is fairly high due to its location between the riverine forest on the outside of the levee and the agricultural area to the inside. This is noted as site 3 on plate 3.

Uncultivated portions of land along the inner levee toe currently support mixed prickly lettuce, ragweed sedges, and goldenrod. Intergrading with the sand levee face, these weeds become mixed with partridge pea, sandbur, velvet leaf, and various dry site grasses. This habitat would support a variety of ground nesting birds as well as provide foraging and travel lanes for other wildlife.

The levee at this site was constructed in 1963. Given the slow vegetation succession rates typically found on sand, it may be anticipated that covering a portion of the existing levee with sand material would result in a 5- to 20-year recovery time for plant species. Silt disposal on the agricultural field would affect crop/cover development for one growing season. This site is currently under private ownership, with the exception of the levee. The landowner is not believed to be amenable to use of this site at this time.

d. Proposed Project Action. The proposed actions, described in Section II - Project Description, are considered environmentally and economically acceptable as planned. Disposal sites and dredging methodology have been selected to reduce water quality impacts as well as impacts to the riverine system. Sites for disposal are primarily upland in nature and materials discharged will be chemically noncontaminating and physically stable.

3. Permits, certification or waiver of certification under Section 401 of the Clean Water Act will be obtained before construction begins. The project will thus be in compliance with water quality requirements of the States of Missouri and Illinois.

4. The project is not anticipated to introduce significant quantities of toxic substances into nearby waters or result in appreciable increases in existing levels of toxic materials.

5. No significant impact to Federal or State listed endangered species will result from this project.

6. The project is situated along a freshwater stream system. No marine sanctuaries are involved or would be affected by the project actions.

7. The project action is part of a federally authorized major rehabilitation project for Lock and Dam 21, Quincy, Illinois.

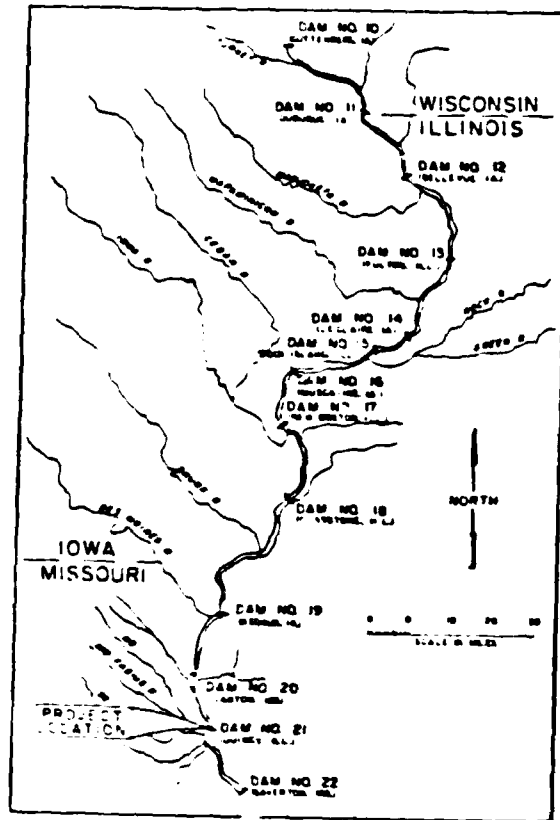
No municipal water supplies will be affected by the proposed action and no degradation of waters of the United States is anticipated by the proposed Federal action.

8. The materials used for construction will be chemically and physically stable and noncontaminating. Dredged materials will be disposed on a disturbed terrestrial area.

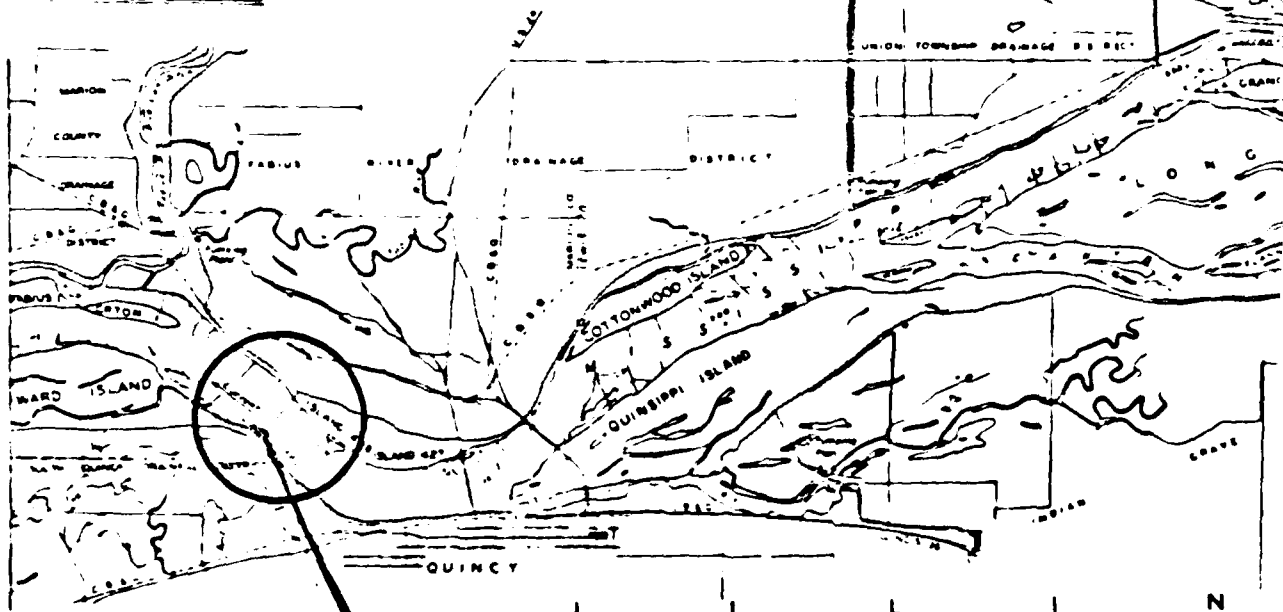
9. No other practical alternatives have been identified. The proposed actions are in compliance with Section 404(b)(1) of the Clean Water Act, as amended. The proposed action will not significantly impact water quality and will improve the integrity of an authorized navigation system.

Date

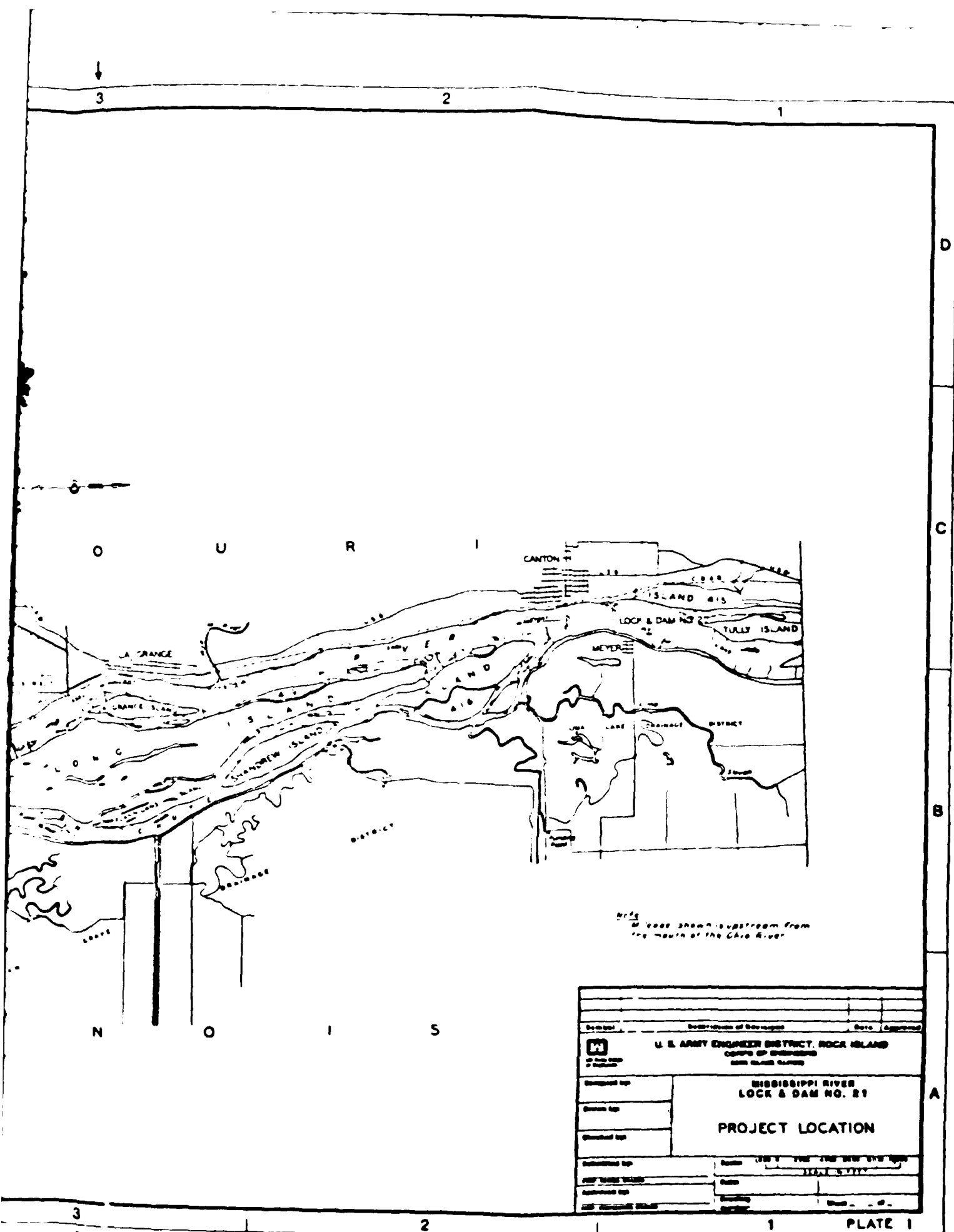
Neil A. Smart
Colonel, Corps of Engineers
District Engineer



VICINITY MAP

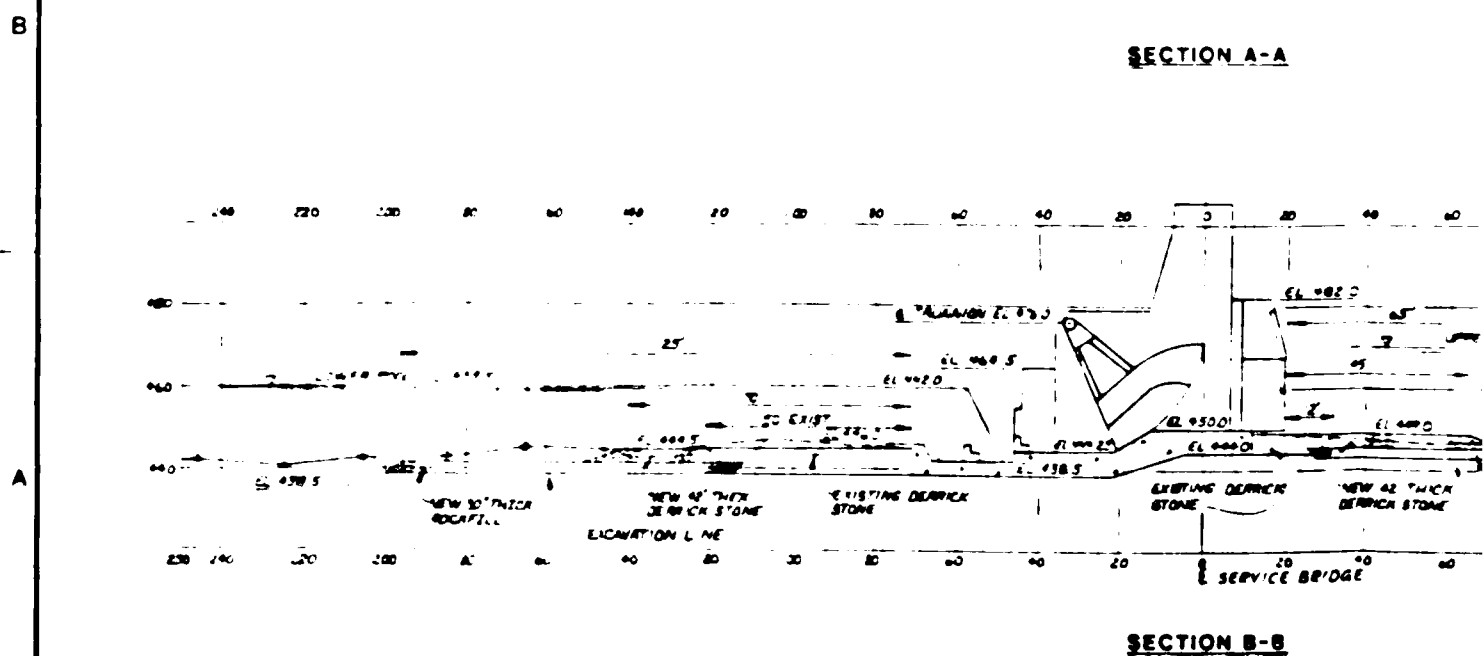
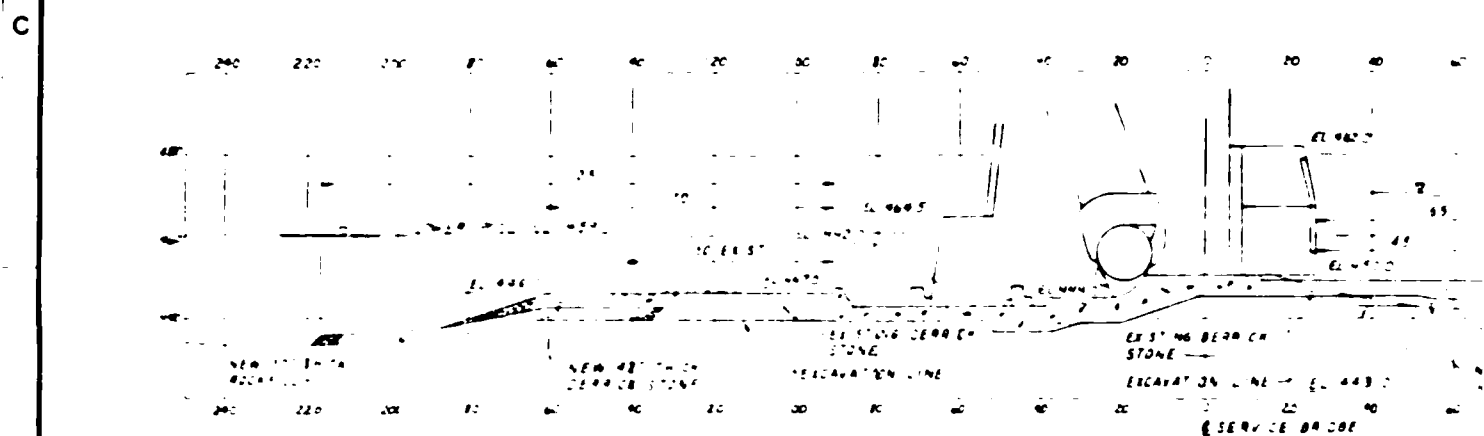
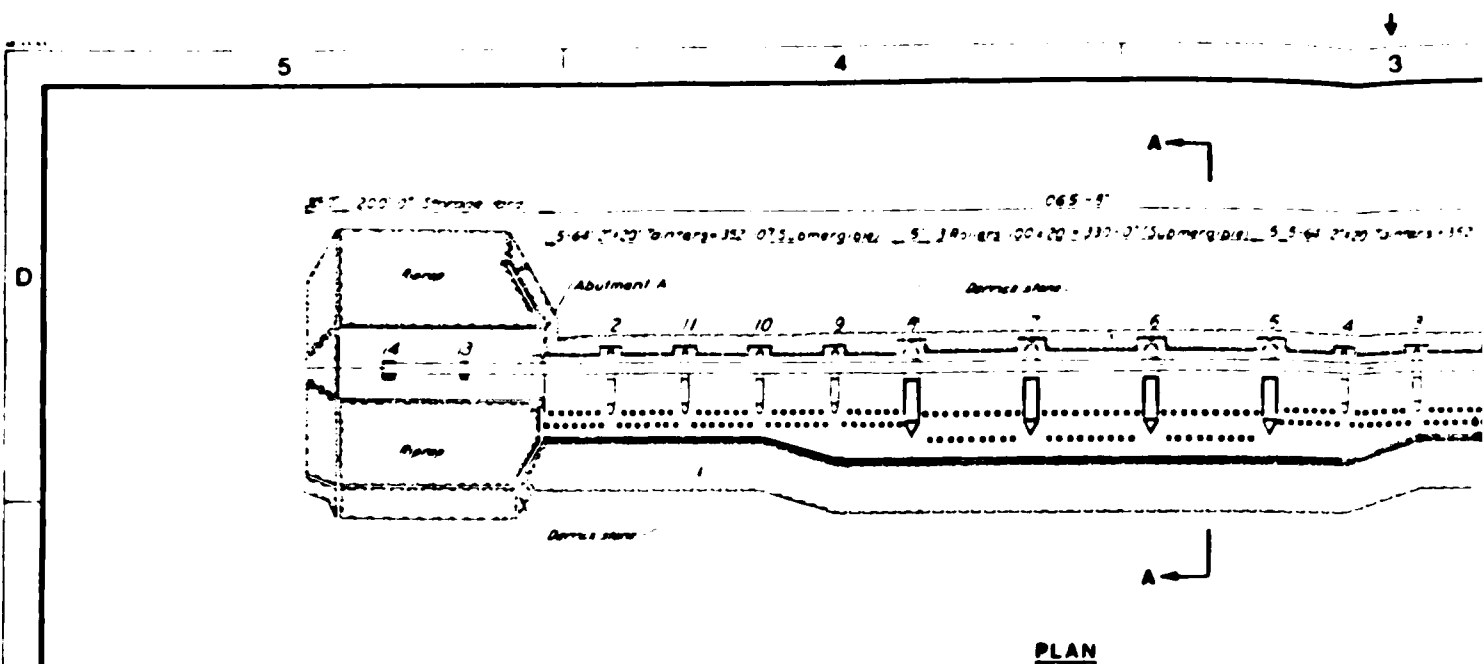


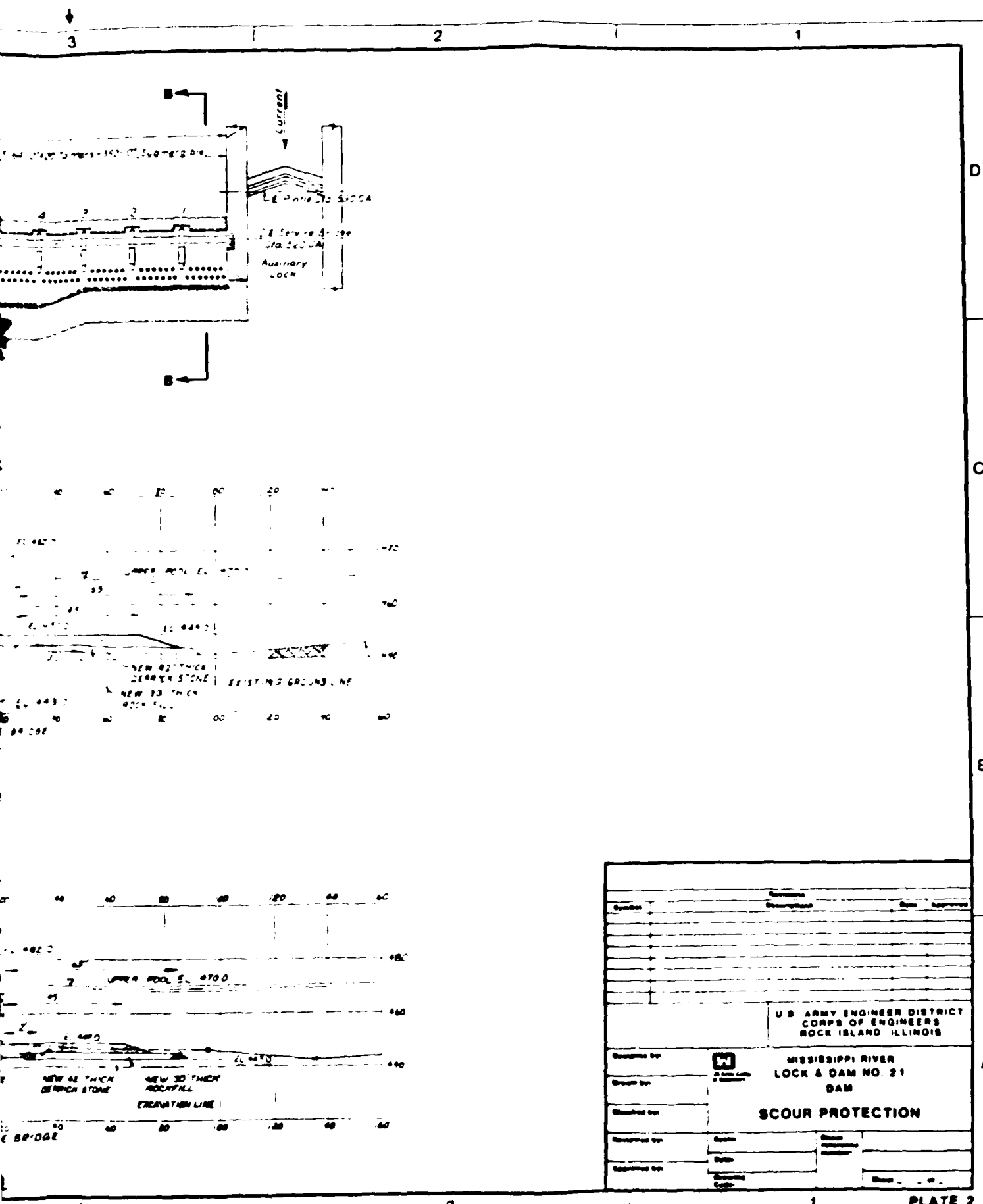
LOCK & DAM NO 21

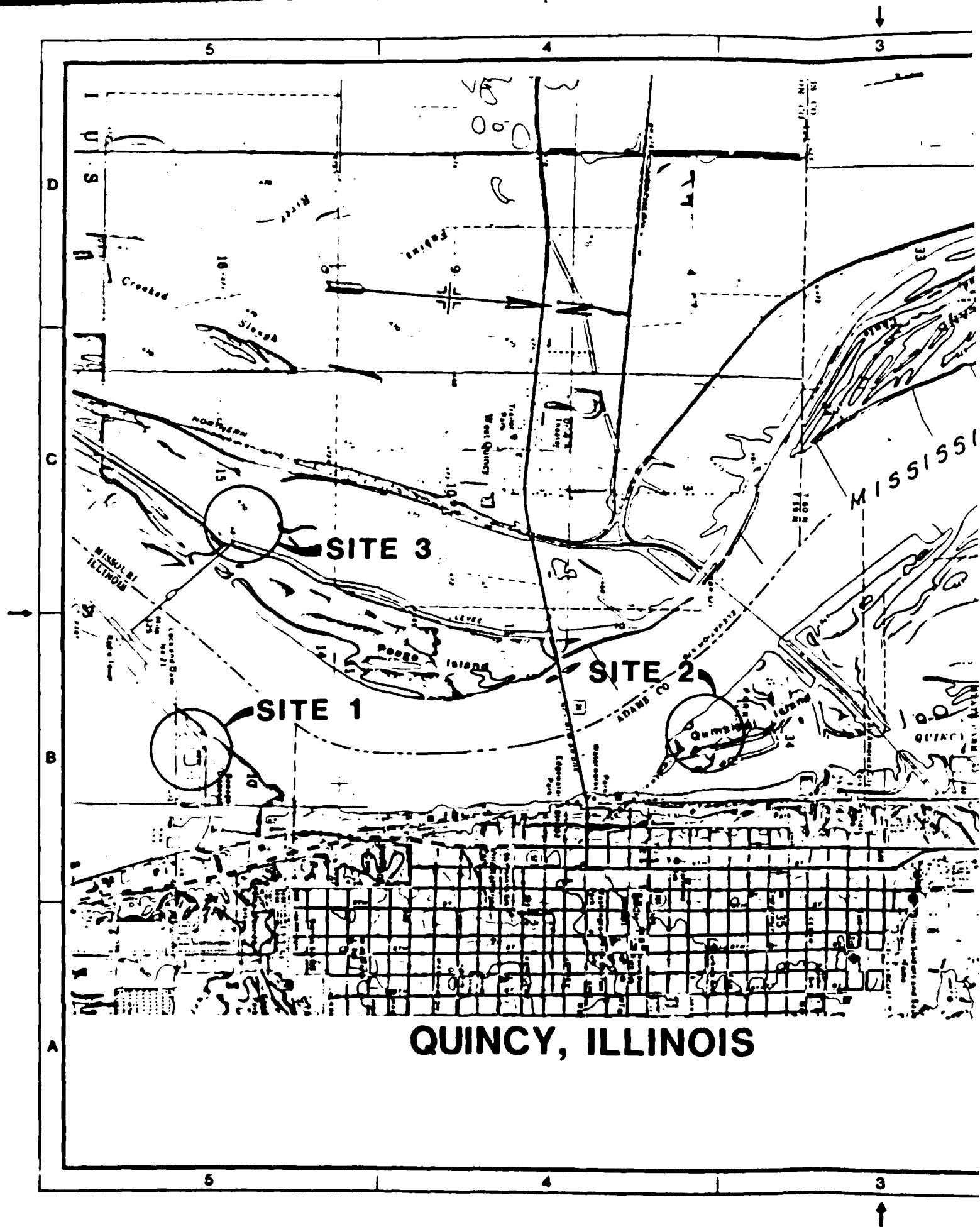


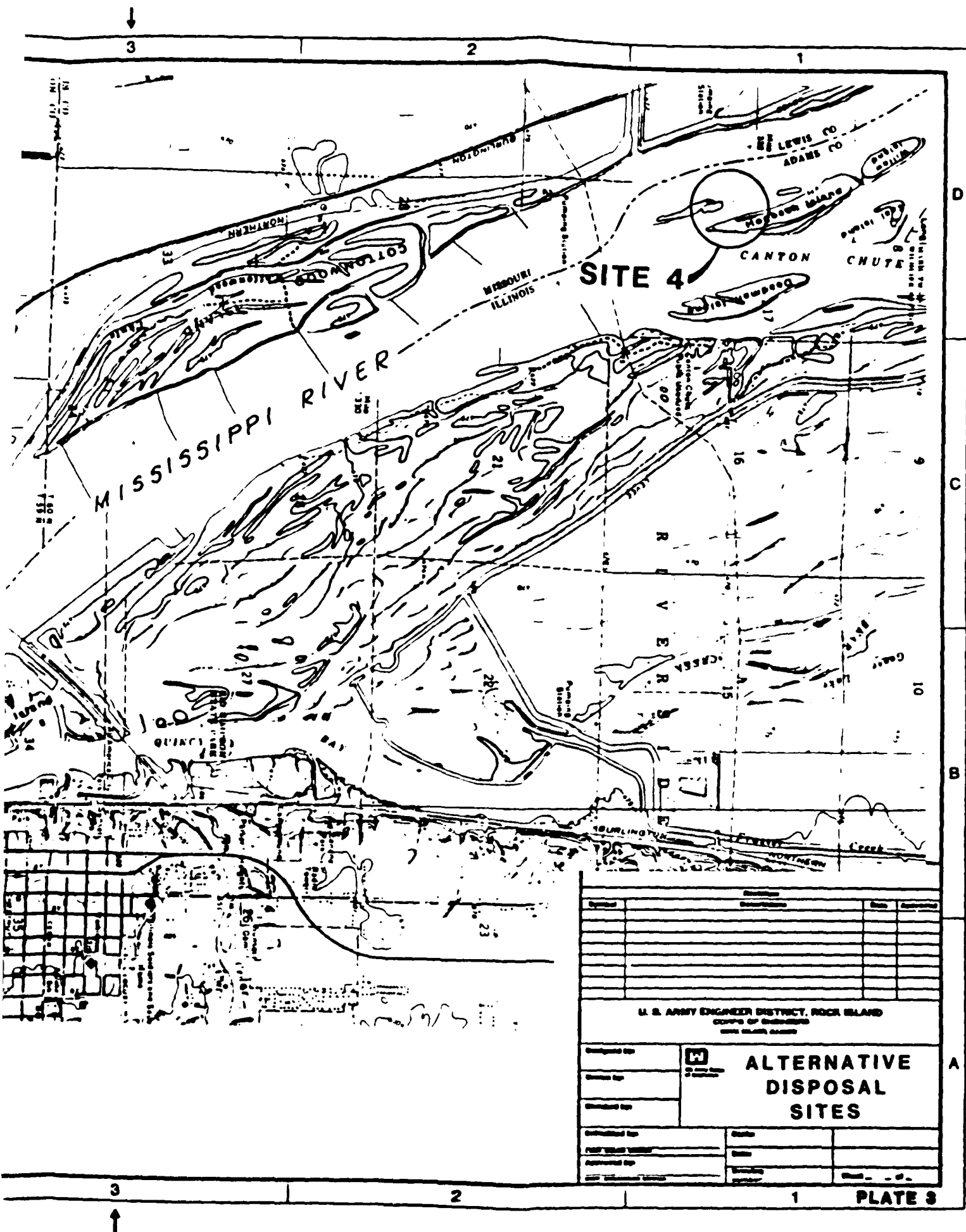
Note: Meier shown is upstream from the mouth of the Ohio River

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS MISSISSIPPI RIVER LOCK & DAM NO. 29	
PROJECT LOCATION	
District Corps Division District Subdistrict Section Subsection	Date Scale Sheet of Total









Symbol	Description	Date	Signature

U. S. ARMY ENGINEER DISTRICT, ROCK ISLAND
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Drawn by			
Checked by			
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